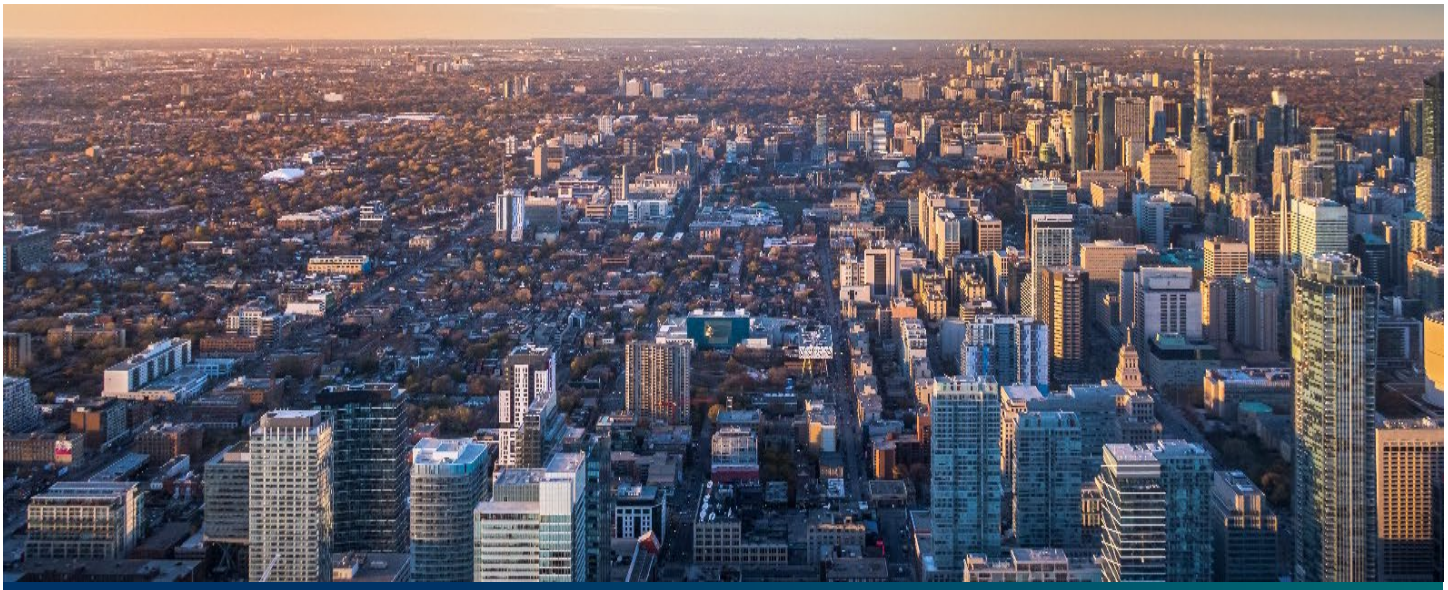

# 2021-2024 Conservation and Demand Management Framework Mid-Term Review

December 2022

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# Executive Summary

Energy efficiency delivered through conservation and demand management (CDM) programs is a key resource for maintaining a reliable, affordable, and sustainable electricity system in Ontario. As electricity demand is forecasted to grow rapidly across the province and existing resources retire or enter refurbishment, the value of CDM to the system increases as a low-cost, non-emitting resource that can respond to changing system needs, and support broader economic development and decarbonization objectives.

The current suite of CDM programs was launched in 2021 as part of a four-year framework, which was designed to deliver cost-efficiencies through centralized program delivery and the use of competitive mechanisms. As result, a greater share of the funding has been directed toward incentives rather than administration compared to prior frameworks.

At its mid-term, the Framework is on track to achieve its original energy and demand savings target. In the remaining two years, enhancements will be made to the programs to reflect changing market conditions and customer feedback. While Save on Energy programs are currently leveraging all feasible energy-efficiency opportunities in Ontario, the 2021-2024 CDM Framework Mid-Term Review highlights the benefit of expanded targets post-2024.

**Mid-Term Enhancements**

In response to early findings from the Mid-Term Review, the Ministry of Energy has directed the Independent Electricity System Operator (IESO) to launch four new or enhanced CDM programs in spring 2023 to maximize energy-efficiency contributions to meet near-term system needs. It is expected that these offerings will deliver an additional 285 megawatts (MW) and annual energy savings of 1.1 terawatt hours (TWh) by 2025. This takes the four-year Framework's cumulative targets to 725 MW of peak demand savings and 3.8 TWh of energy savings by 2025, with continued savings persisting well beyond the Framework term.

**Long-Term Implications**

Beyond the current Framework, there are significant opportunities for CDM to help meet growing system needs. As much as 485 MW and 5.2 TWh by 2028, and approximately 1,850 MW and 16 TWh by 2033 in cost-effective energy and demand reductions can support reliability, contribute to affordability, and foster decarbonization efforts by reducing the need for natural gas generation.

**Supporting Pathways to Decarbonization**

The achievable CDM potential supports key findings from the IESO's Pathways to Decarbonization report, which concludes that Ontario is in a strong position to decarbonize its rapidly-growing electricity grid, starting with a moratorium on natural gas generation in 2027 provided new storage, nuclear, renewables and expanded conservation efforts are ready when needed. Achieving zero emissions objectives requires Ontario to continue to build and expand its use of CDM to meet system needs.

## Recommendations and Next Steps

Based on reviews of customer needs, system needs, programs, and competitive mechanisms, and informed by consultations with local distribution companies (LDCs), customer associations, municipalities, CDM service delivery partners and other stakeholders, the IESO is submitting a series of recommendations and next steps as part of the Mid-Term Review:

- Continue to implement the enhanced 2021-2024 CDM Framework Program Plan, including programming for income-eligible and on-reserve First Nations communities, according to budgets, targets and schedules, while fulfilling program-enhancement opportunities.
- Collaborate with other entities, including Enbridge and Natural Resources Canada, to help program participants achieve deeper savings and reduce IESO administrative costs.
- Engage with LDCs on opportunities to build on CDM programs to provide local system benefits, leveraging the Ontario Energy Board's CDM Guidelines for Electricity Distributors.
- Adopt an enduring approach for post-2024 that better leverages CDM as a resource to respond to evolving system and customer needs while continuing to provide appropriate reporting and government oversight.
- Establish post-2024 CDM targets and budgets that reflect forecasted system needs; achievable potential; and equity, diversity and inclusion so no one is left behind.
- Reallocate a portion of the current Framework's budget for research and development activities for post-2024 programs, including single- and multi-family residential programs, and efficient electrification programs.

In all, Ontario is well positioned to seize opportunities to expand the scale and nature of CDM to address changing system and customer needs now and into the future. The IESO will incorporate the many learnings from the mid-term review into its core work. This includes managing and developing energy-efficiency programs that will continue to help ensure the IESO delivers the best value for program participants and Ontario ratepayers, openly and transparently.

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# Abbreviations

| | |
|---|---|
| AAR | Annual Acquisition Report |
| APO | Annual Planning Outlook |
| APS | Achievable Potential Study |
| BTM | behind-the-meter |
| CDM | Conservation and Demand Management |
| COVID-19 | Coronavirus Disease 2019 |
| DER | distributed energy resource |
| DERMS | distributed energy resource management system |
| EAP | Energy Affordability Program |
| EDI | Equity, diversity and inclusion |
| EEAP | Energy Efficiency Auction Pilot |
| FNCBRP | First Nations Community Building Retrofit Program |
| GHG | greenhouse gas |
| GW | gigawatt |
| GWh | gigawatt-hour |
| HVAC | heating, ventilation and air conditioning |
| IESO | Independent Electricity System Operator |
| LDC | local distribution company |
| LED | light-emitting diode |
| LIP | Local Initiatives Program |
| MW | megawatt |
| MW-year | megawatt-year |
| MWh | megawatt-hour |
| OEB | Ontario Energy Board |
| PAC | Program Administrator Cost |
| PG&E | Pacific Gas & Electric Company |
| PV | photovoltaics |
| RFNEEP | Remote First Nations Energy-Efficiency Program |

| | |
|---|---|
| SEM | Strategic Energy Management |
| TRC | total resource cost |
| TWh | terawatt-hour |

# 1. Introduction

## 1.1 High-Level Description of the 2021-2024 Conservation and Demand Management (CDM) Framework

On September 30, 2020, the Minister of Energy, Northern Development and Mines directed the Independent Electricity System Operator (IESO) to establish a 2021-2024 Conservation and Demand Management (CDM) Framework aimed at offering a suite of centrally delivered programs to help consumers – including industrial, commercial, institutional, on-reserve First Nations, low-income and income-eligible residential consumers – manage their electricity use while meeting electricity system needs (September 30, 2020, Directive).

The IESO developed a CDM Program Plan to satisfy the September 30, 2020, Directive. The Plan detailed the programs to be delivered under the new Framework, including their forecasted energy savings, demand savings and cost. The Directive and Plan established a target of 440 megawatts (MW) of peak demand savings and 2.7 terawatt-hours (TWh) of energy savings, with an associated cost of $692 million, for the four-year term of the Framework.

## 1.2 Requirements for the Mid-Term Review

The September 30, 2020, Directive also required the IESO to undertake a Mid-Term Review to reassess forecasted electricity system needs and inform potential changes to programs, targets and budgets for the latter half of the CDM Framework. Specifically, the review needs to examine:

- Alignment of the demand reduction target, electricity target and Framework budget with provincial, regional and/or local electricity system needs, as identified by the IESO;
- Alignment of CDM program offerings with consumer needs in Ontario and a comparison against programs from other jurisdictions;
- Lessons learned and recommendations from competitive mechanisms for procuring energy-efficiency resources, including results to date of the Energy Efficiency Auction Pilot (EEAP);
- The progress and impact of CDM programs, including for income-eligible and on-reserve First Nations consumers; and
- Recommendations on the remainder of the CDM Framework.

The September 30, 2020, Directive was subsequently amended[1] to include an additional requirement for the review:

- An exploration of opportunities for local distribution companies (LDCs) to build on IESO CDM programs where they can add value to the distribution system.

[1] The September 30, 2020, Directive was amended on October 4, 2022, to increase the 2021-2024 CDM Framework's targets and budgets to respond to emerging near-term system needs through new and enhanced CDM programming. As noted, the amendment also included an additional requirement for the Mid-Term Review.

This Mid-Term Review is designed to satisfy the Minister's Directive. Its findings are being submitted to the Minister by December 31, 2022, and will be accompanied by the updated 2021-2024 CDM Framework Program Plan.

## 1.3 IESO's Approach to Completing the Mid-Term Review

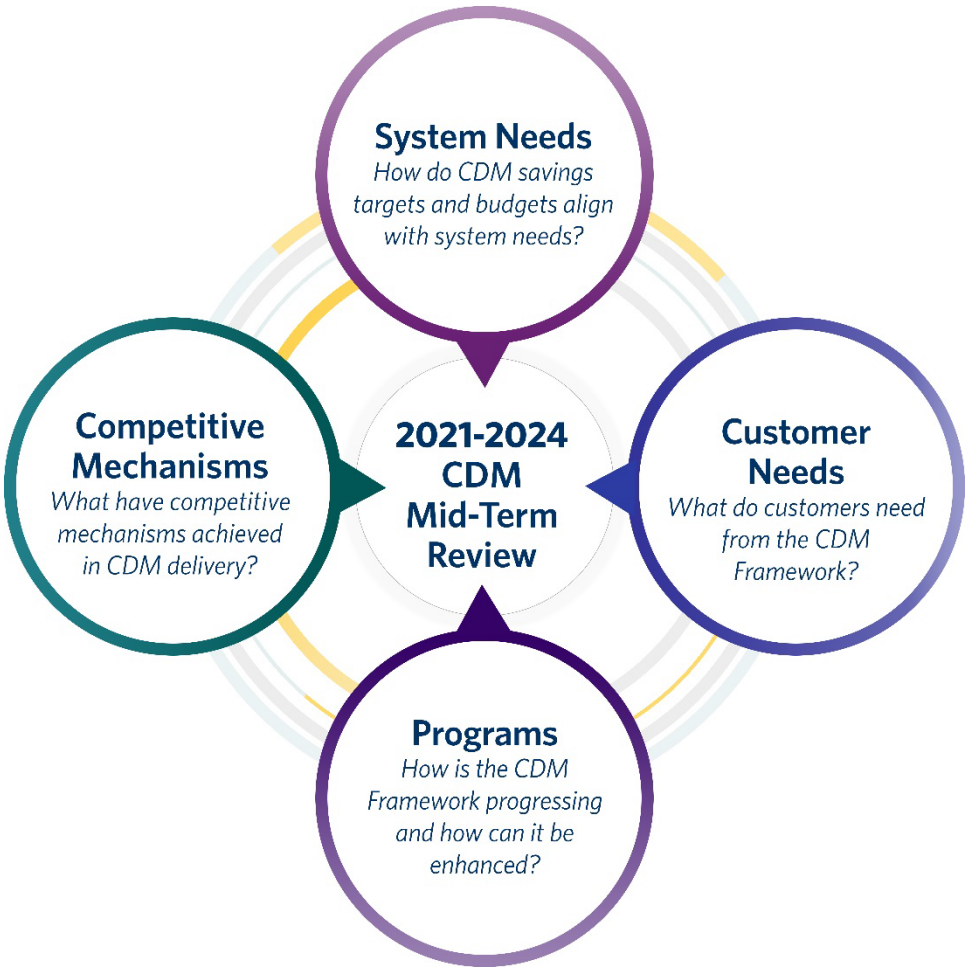
This Mid-Term Review is structured around the six components specified in the Minister's Directive:

1. System needs
2. Customer needs
3. The CDM Framework's portfolio of programs
4. Competitive mechanisms
5. LDC collaboration
6. Consolidated recommendations

Of note, on April 4, 2022, the Minister provided a letter to the IESO in response to the 2022 Annual Acquisition Report (AAR). Complementary to the September 30, 2020, Directive to undertake the Mid-Term Review, this letter requested the IESO to develop expedited options for new and expanded CDM programming to help address the system needs identified in the 2021 Annual Planning Outlook (APO) and further discussed in the 2022 AAR. The IESO submitted its report back to the Minister on July 15, 2022, and received a Directive on October 4, 2022, to proceed with the IESO's proposal of four new or expanded programs (referred to in this report as the AAR Report Back programs), resulting in revised Framework targets of 725 MW of peak demand savings and 3.8 TWh of energy savings, and a total budget of $1.034 billion. The IESO report back incorporated early findings of this Mid-Term Review; as well, the Mid-Term Review will report on the new programs and their current status.

To inform the development of the Mid-Term Review and the 2022 AAR report back, the IESO undertook both primary and secondary research, including cross-jurisdictional research, customer and service delivery partner surveys and stakeholder consultation through multiple avenues. This included a formal engagement that attracted participation from LDCs, customer associations, municipalities, service delivery partners, and other stakeholders. The IESO also undertook a variety of complementary outreach activities, particularly as they relate to understanding customer needs. These activities are detailed further in the Customer Needs Review, below. Key inputs to the Mid-Term Review are summarized in Figure 1.

**Figure 1 | Inputs to the Mid-Term Review**



# 2. System Needs Review

The system needs review assesses how forecasted system needs have changed since the development of the 2021-2024 CDM Framework, the implications for the value of CDM investment and how the Framework's current targets and budget align with the opportunity for cost-effective CDM. The system needs review is a critical piece to inform potential changes to targets and budget for the remainder of the Framework.

## 2.1 Key Findings

Ontario's forecasted system needs have increased significantly since the development of the Framework. The province's electricity demands are entering a time of growth that is occurring alongside the retirement of generation assets. This provides an opportunity for CDM to further offer cost-effective solutions to meet the province's capacity and energy needs.

To understand the opportunities and value for CDM, a review of the system demand forecast from the 2021 APO was conducted. This review highlights that, compared with the 2019 APO, which informed the 2021-2024 CDM Framework's initial targets and budgets, forecasted energy demand has increased by 9.8 TWh in 2028 and 16.8 TWh in 2033. Similarly, forecasted peak demand has increased by 1.4 gigawatts (GW) in 2028 and 2.0 GW in 2033. The key sectors driving growth are the industrial and agricultural sectors.

Avoided costs for CDM were also generated using the 2021 APO's forecasts. In 2033, the avoided cost for energy is forecasted to have increased by 5 per cent for energy, 38 per cent for summer capacity and 350 per cent for winter capacity. Winter capacity needs are forecasted to increase at a faster rate than energy or summer capacity needs, driven by increased greenhouse electricity demand growth, among other factors.

Leveraging the updated avoided cost and the demand forecast information, the 2019 Achievable Potential Study (APS) model was updated and results were compared with current savings targets. The 2022 APS refresh results estimate achievable savings potential of 485 MW and 5.2 TWh above current targets – including 2021-2024 CDM Framework and AAR report-back programs – in 2028 and 1,851 MW and 16.1 TWh in 2033.

An exercise was conducted to assess the opportunity for incremental targeted CDM to address forecasted regional and local (i.e., distribution-level) needs identified through the regional planning process. The exercise identified as much as 740 MW of regional and local needs that could be addressed with targeted CDM, indicating that a potential opportunity for targeted local CDM is an order of magnitude greater than the present target.

As noted, the system needs review analysis is largely premised on 2021 APO data. Should more aggressive electrification trends materialize than assumed in the 2021 APO – as recently explored in the IESO's Pathways to Decarbonization (P2D) study – or natural gas generation be excluded from future resource procurements, the value of CDM investment to ratepayers (and the quantity of cost-effective achievable savings potential in the province) would be even greater.

## 2.2 Changes to Forecasted Provincial System Demands and Needs

Since 2018, the IESO has published APOs that forecast Ontario's energy and peak demand over a 20-year horizon. The APOs also compare forecasted demand against the fleet of resources used to identify energy and capacity needs.

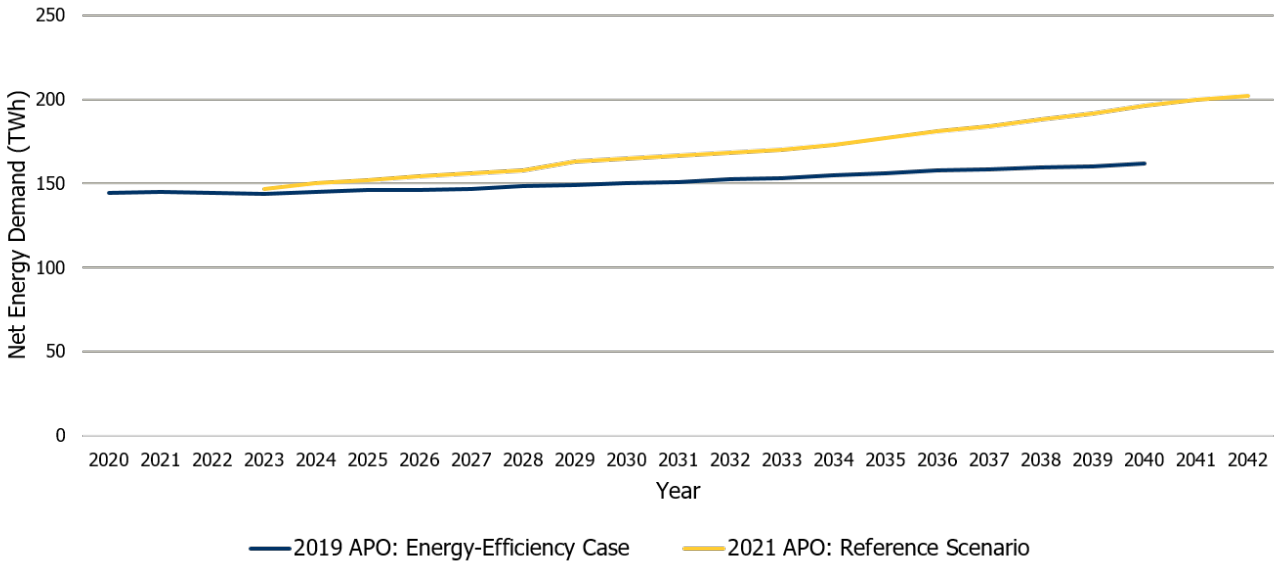
The development of the 2021-2024 CDM Framework was informed by the forecasted demand and needs outlined in the 2019 APO. Since the development of the Framework, the forecasted demand and associated needs, as captured in the 2021 APO, have increased significantly. The energy demand forecast for 2033 has increased by 16.8 TWh, from 153.3 TWh to 170.1 TWh, and the summer peak demand forecast has increased by almost 2 GW, from 25.3 GW to 27.2 GW. Increased demand affects capacity and energy needs, avoided costs for CDM and the cost-effective achievable potential available in the province.

This subsection compares 2019 APO and 2021 APO forecasted energy and peak demand and associated system needs at the provincial level. It then compares forecasted energy demand at the sector level to provide a better view of the drivers of change and opportunities for CDM programming. In line with the goal of informing the review of the current CDM Framework, the analysis and commentary largely focus on the time period from today to 2033. It is worth acknowledging that the 2021 APO demand forecast was used as the starting point for the demand forecast used in the IESO's P2D study's Moratorium scenario, assessing the feasibility of a moratorium on the procurement of new natural gas generation in the next decade. For the P2D analysis, the 2021 APO demand forecast was modified to assume that CDM investment is ramped up from (pre-October 4, 2022, Directive) 2021-2024 CDM Framework levels to achieve the maximum estimated achievable potential from the 2019 APS. This assumption reflects the critical role of cost-effective CDM in decarbonization pathways.

### 2.2.1 Comparison of 2019 and 2021 Provincial Energy and Peak Demand Forecasts

The 2021 APO's energy demand forecast is higher than the 2019 APO's (see Figure 2). Compared with the 2019 APO, the 2021 APO forecasts that annual energy demand will be 9.8 TWh higher in 2028 and 16.8 TWh higher in 2033.

**Figure 2 | Provincial Energy Demand (2019 versus 2021 APO)**




The 2021 APO peak demand forecasts for summer and winter are also higher than forecasted in the 2019 APO (see Figures 3 and 4). Compared with the 2019 APO, the 2021 APO forecasts that summer peak demand will be 1.4 GW higher in 2028 and 2.0 GW higher in 2033; winter peak demand will be 2.2 GW higher in 2028 and 3.2 GW higher in 2033. The larger increase in forecasted winter peak demand reflects growing electricity needs from the agricultural sector, particularly the continued expansion of indoor agriculture.

**Figure 3 | Provincial Summer Peak Demand (2019 versus 2021 APO)**

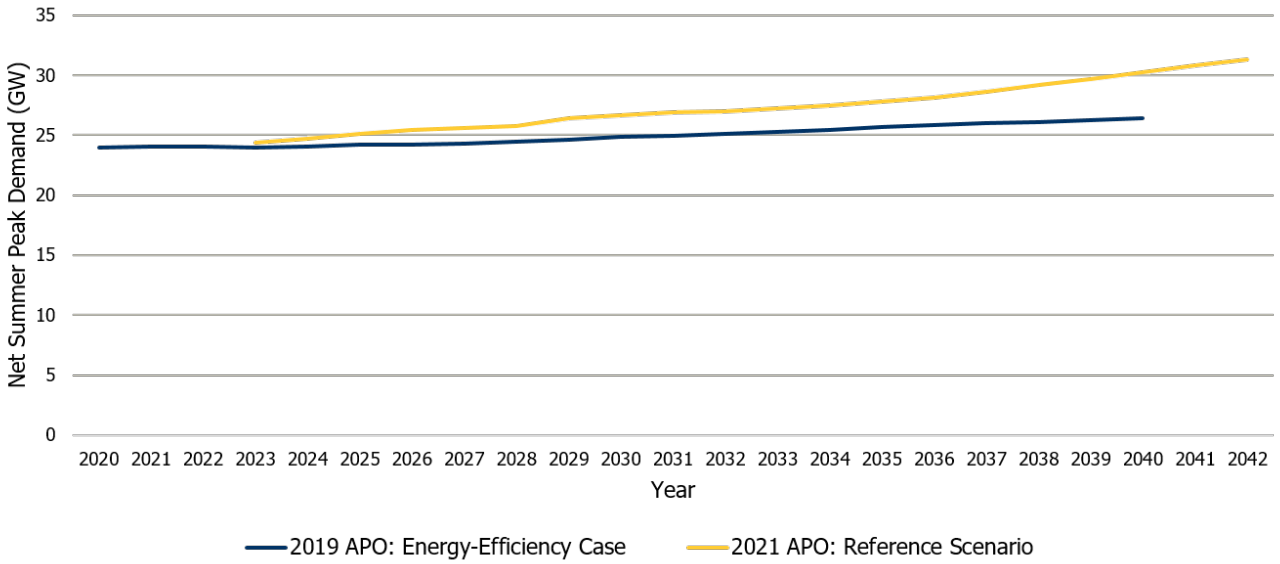
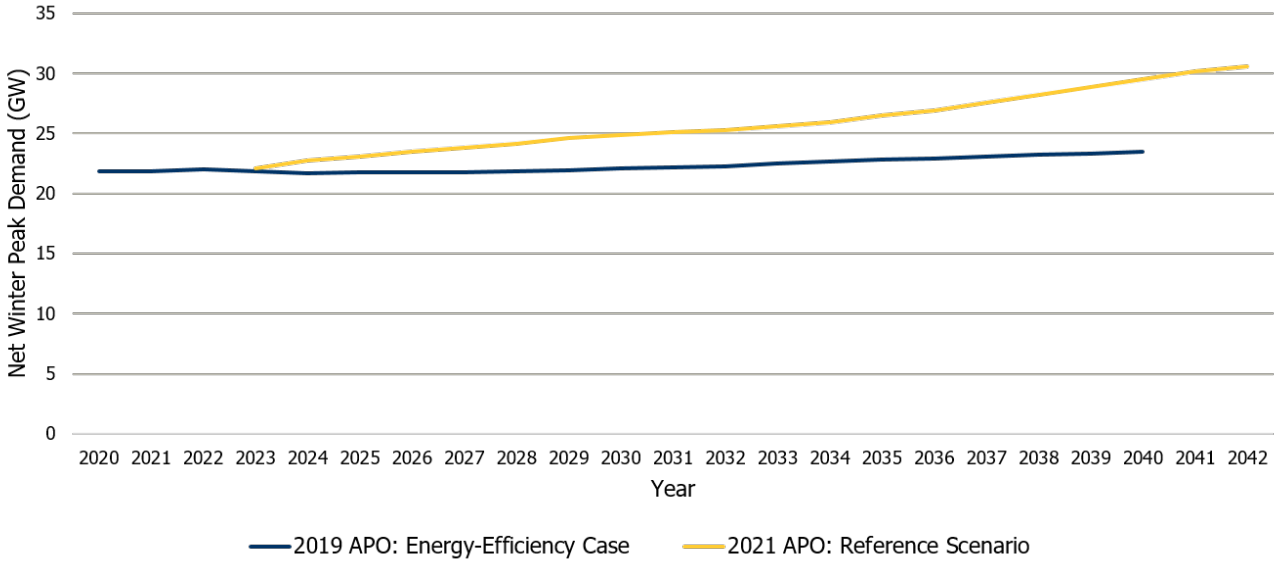


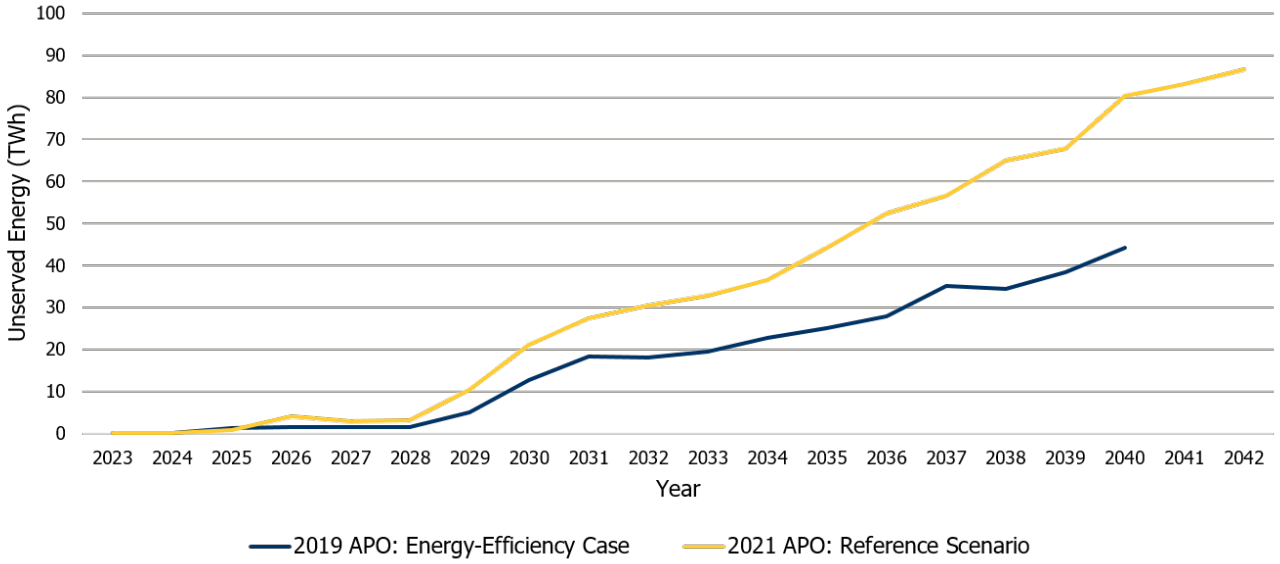
**Figure 4 | Provincial Winter Peak Demand (2019 versus 2021 APO)**




### 2.2.2 Comparison of 2019 and 2021 Provincial Unserved Energy and Capacity Needs Forecasts

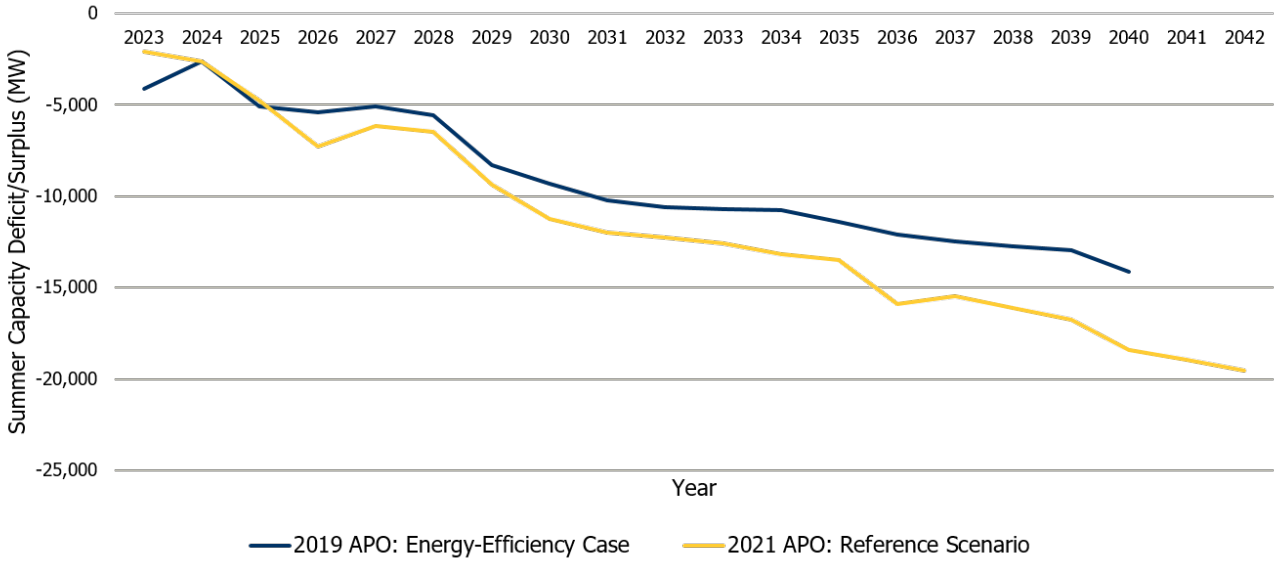
Higher energy and peak demand forecasts in the 2021 APO translate into greater needs for energy and capacity than those outlined in the 2019 APO (see Figures 5 and 6). The needs outlined in the figures assume that existing resources are not reacquired following the expiry of their current contracts. The 2021 APO-forecasted energy needs are approximately 1.5 TWh higher in 2028 and 13.3 TWh higher in 2033.

**Figure 5 | Unserved Energy Needs (2019 versus 2021 APO)**




Summer capacity needs are 937 MW higher in 2028 and 1,869 MW higher in 2033. Winter capacity needs are not included in this review, as Ontario is forecasted to remain a summer-peaking electricity system to the end of the 2021 APO forecast horizon.

**Figure 6 | Summer Capacity Needs (2019 versus 2021 APO)**




### 2.2.3 Comparison of 2019 and 2021 Sectoral Energy Demand Forecasts

The APO provides energy-demand forecasts at sectoral levels. As noted above, a comparison of sectoral energy demand forecasts provides visibility into the drivers of changes to provincial energy and peak demand forecasts and helps highlight opportunities for CDM programming.

**Table 1 | Comparison of 2019 and 2021 APO Forecasted Energy Demand by Sector**

| Sector | Difference between 2019 and 2021 APO in 2028 | Difference between 2019 and 2021 APO in 2033 | Zones of Particular Growth |
|---|---|---|---|
| Residential | +0.2 TWh | +1.5 TWh | Ottawa, southwest, Toronto |
| Transportation | +0.2 TWh | +1.5 TWh | N/A |
| Agriculture | +1.8 TWh | +3.8 TWh | West |
| Commercial | +1.8 TWh | +1.0 TWh | Essa, southwest |
| Industrial | +3.1 TWh | +6.7 TWh | Northwest, northeast, southwest |

## 2.3 Review of Regional Needs

In addition to planning for near- and long-term electricity system needs at the bulk system level, the IESO works with LDCs, transmitters, municipalities and other stakeholders to plan for future electricity needs in Ontario's 21 electricity planning regions. Regional system planning examines the unique needs of each planning region and considers how CDM, generation, transmission and distribution can meet those needs.

To facilitate implementing CDM solutions to address regional and local planning needs, the 2021-2024 CDM Framework established the Local Initiatives Program (LIP), which procures targeted CDM incremental to standard province-wide programs in areas where CDM can provide additional benefits. As part of the review of how the 2021-2024 CDM Framework's targets and budgets align with regional and/or local needs, the IESO conducted an exercise to establish the approximate scope of the opportunity for targeted CDM to address regional and local planning needs, in isolation or conjunction with other solutions (e.g., energy storage). See Appendix 1 for additional details about the process used to identify regional needs.

### 2.3.1 The Opportunity for Regionally Targeted CDM

The exercise identified 23 needs totaling up to 740 MW of required local peak demand relief with the potential to be addressed by targeted CDM over the next 15 years. Of this, approximately 435 MW is aligned with the provincial system peak period. Additional analysis and consultation with LDCs and local stakeholders in the identified areas is required to verify the exact size of each targeted CDM opportunity from a program and procurement perspective; however, the total opportunity for regionally targeted CDM appears to exceed what could be pursued through the original LIP, with its 57 MW target and $65.6 million budget.[2] Regional planners supporting the exercise also highlighted challenges under the current Framework, whereby the Integrated Regional Resource Planning process may identify targeted CDM as the lowest-cost solution to an identified need, but there is a lack of certainty that the CDM solution can be implemented due to limited target, budget and Framework term. This restricts the present ability to rely upon targeted CDM as a solution to meeting regional needs. The exercise also identified a series of targeted CDM benefits that are not currently recognized in traditional avoided cost and program cost-effectiveness testing, including the following:

- **Reliability:** Improved reliability for existing customers where needs are immediate
- **Outage management:** Limiting the quantity and duration of planned outages required to integrate new transmission infrastructure, which affects customers and the IESO's operational flexibility to respond to real-time contingencies to maintain reliability
- **Connection queue:** Allowing new customers to connect sooner by opening connection capacity
- **Decarbonization**: Meeting customers' electricity needs without increasing emissions

This exercise indicates that there is additional opportunity to leverage CDM initiatives to target regional needs in order to maximize benefits to the electricity system and ratepayers.

[2] As part of the Framework enhancements emerging from the October 4, 2022, Directive, LIP now has a 96.4 MW target and $140 million budget.

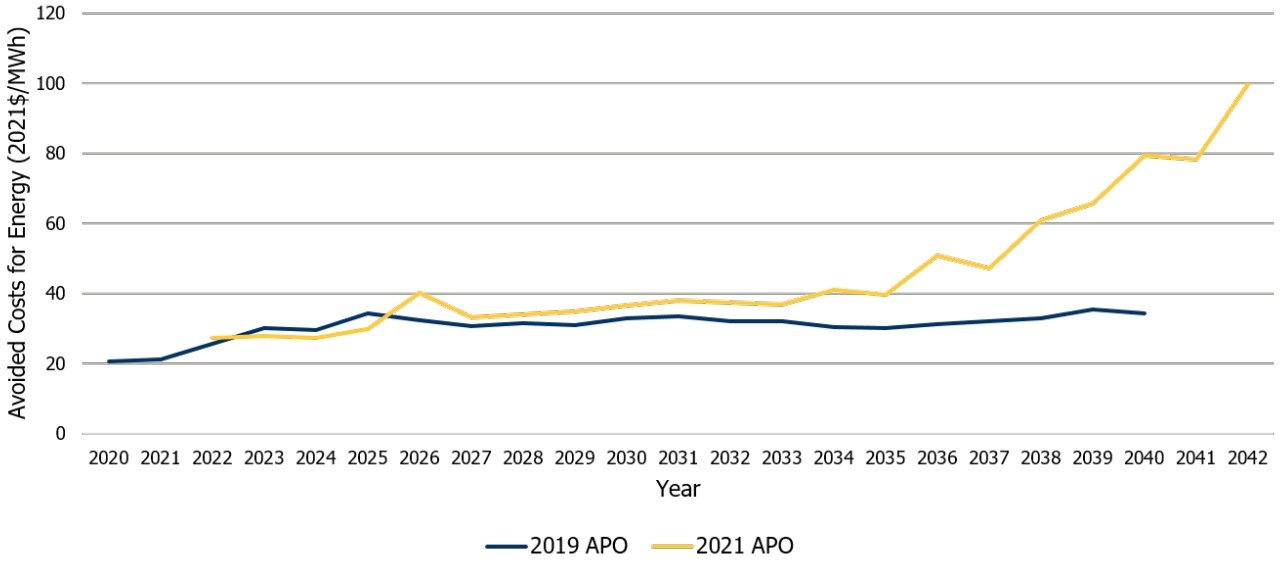
## 2.4 Changes to Avoided Costs

The IESO performs avoided cost calculations to determine the cost for energy and capacity that would otherwise need to be acquired from supply resources in the absence of CDM programs. Avoided costs are typically represented in $/MWh for avoided energy and $/MW-year for avoided capacity, and represent a price threshold for CDM investment to be cost-effective. When the costs of energy and peak demand savings from a CDM program or program portfolio are less than the avoided costs, the program provides a financial net benefit to ratepayers. The development of the 2021-2024 CDM Framework was informed by avoided costs calculated based on inputs from the 2019 APO. As part of the Mid-Term Review, the IESO calculated updated avoided costs based on the 2021 APO inputs.

### 2.4.1 Comparison of 2019 and 2021 Avoided Costs

The updated calculations show increased avoided costs for energy, summer capacity and winter capacity over most of the forecast period (see Figure 7). The avoided costs based on the 2019 APO have been adjusted for inflation to provide an accurate comparison. (Avoided cost figures represent real 2021 Canadian dollars.)

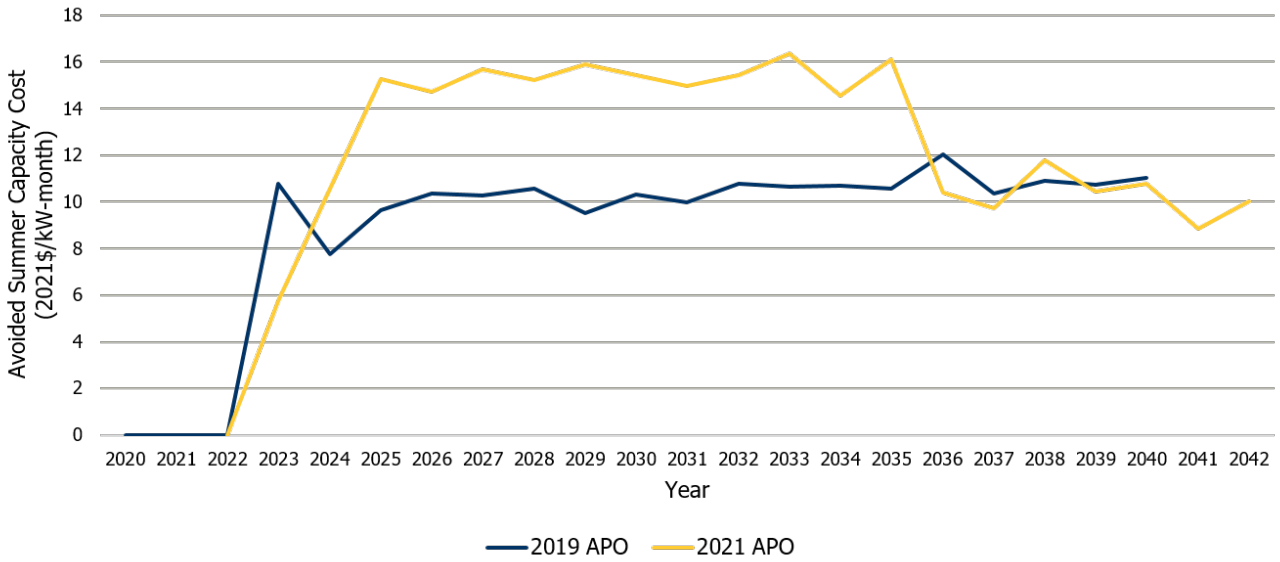
**Figure 7 | Avoided Energy Costs (2019 versus 2021 APO)**




Avoided energy costs are driven by forecasted energy demand, with an upper limit based on the most expensive energy resource. Avoided energy costs increase by 5 per cent by 2033, followed by greater increases in later years. This reflects the differences between the 2021 and 2019 APO energy demand forecasts, with the 2021 APO forecasting higher demand, particularly in later years, due to stronger mining demand, new industrial developments, increased immigration and transportation electrification, among other factors. The greater increases in avoided energy costs in later years also reflect expectations that higher-cost natural gas generation will need to run more frequently to meet demand, setting energy prices for more hours and increasing average energy costs.[3]

[3] It is important to note that an increase in natural gas generation does not necessarily mean an increase in economy-wide emissions, as the carbon intensity of electricity would remain far below that of other fuels being displaced by electricity (e.g., gasoline and fuel oil). See

**Figure 8 | Avoided Summer Capacity Costs (2019 versus 2021 APO)**

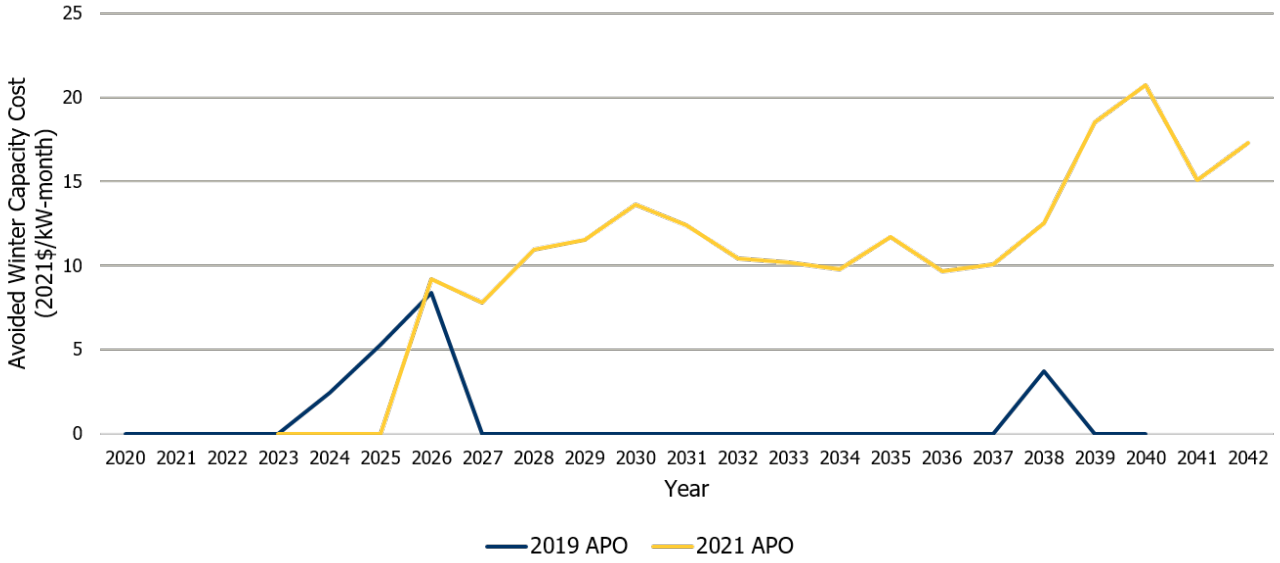



Avoided capacity costs are driven by forecasted capacity needs (and associated reserve requirements), with an upper limit based on the net-cost of new entry for the anticipated lowest-cost capacity resource.[4] The updated 2021 APO-based avoided capacity costs for both summer and winter are generally higher than the 2019 APO-based avoided costs, reflecting both higher forecasted capacity needs and increased cost assumptions for the net-cost of new entry in the more recent outlook. Avoided summer capacity costs increase by 38 per cent by 2033, as similar factors driving increased energy demand drive increased peak demand and capacity needs.

the 2021 APO for further discussion on the dynamics driving forecasted increases in marginal costs in the latter half of the 2030s and projected electricity-sector greenhouse gas emissions.

[4] The net cost of new entry refers to the annual revenue requirement that a new resource needs to earn from the capacity market to be financially viable, after considering energy and ancillary services revenue.

**Figure 9 | Avoided Winter Capacity Costs (2019 versus 2021 APO)**




Avoided winter capacity costs increase by 350 per cent by 2033, driven by similar demand and capacity value factors affecting the avoided energy and summer capacity costs. Avoided winter capacity costs are expected to increase more significantly than these other avoided costs. This reflects the more pronounced changes in forecasted winter capacity needs between the 2021 and 2019 APO, driven primarily by the impacts of increased agricultural lighting–demand growth on winter peak demand (all else being equal, increased peak demand will result in increased capacity requirements).

There is significant potential for avoided summer and winter capacity costs to grow even higher. The 2021 APO avoided cost modelling is premised around estimates of the cost to acquire new single-cycle gas turbine generation as the lowest-cost capacity resource option. If new natural gas is not eligible for future resource procurements, or supply chain disruptions and other macroeconomic conditions increase actual acquisition costs, CDM avoided capacity costs will increase even further.

Higher avoided costs indicate increased value for CDM and improve program cost-effectiveness, supporting the case for greater CDM investment to address forecasted system needs. In particular, higher avoided costs for energy and capacity support increased investment in measures and programs that reduce energy and capacity needs relative to the 2021-2024 CDM Framework portfolio.

In response to the October 4, 2022, Directive to enhance the 2021-2024 CDM Framework, the IESO will publish an updated CDM Program Plan featuring revised cost-effectiveness test results and metrics for programs reflecting the updated avoided costs (and updated non-energy benefit valuations).[5]

[5] Since the development of the original CDM Program Plan, the IESO completed the Non-Energy Benefits Study: Phase II, which produced updated valuations for non-energy benefits considered in cost-effectiveness testing, such as reduced product spoilage and improved indoor-air quality.

## 2.5 Achievable Potential Study Refresh

### 2.5.1 The APS Refresh Exercise

In 2019, the IESO and the Ontario Energy Board (OEB) completed the first integrated electricity and natural gas conservation APS, which identified and quantified electricity and natural gas energy-savings potential, electricity demand savings potential and associated costs from energy-efficiency measures from 2019-2038. To support the Mid-Term Review, the IESO undertook a refresh exercise in which the model developed for the 2019 APS was refreshed with various inputs from, or based on, the 2021 APO data to produce an updated estimate of the maximum CDM achievable potential (not including demand response potential) for the period 2023-2042.[6] More information about the methodology, model inputs and detailed results of the 2019 APS and 2022 APS refresh are available on the APS web page.

The 2022 APS refresh details how changes to forecasted demand and system needs translate to changes in the quantity of cost-effective energy as well as peak demand savings that could be practically acquired through CDM programs. Given the objectives of the Mid-Term Review, this section primarily focuses on presenting refresh results for the next 10 years.

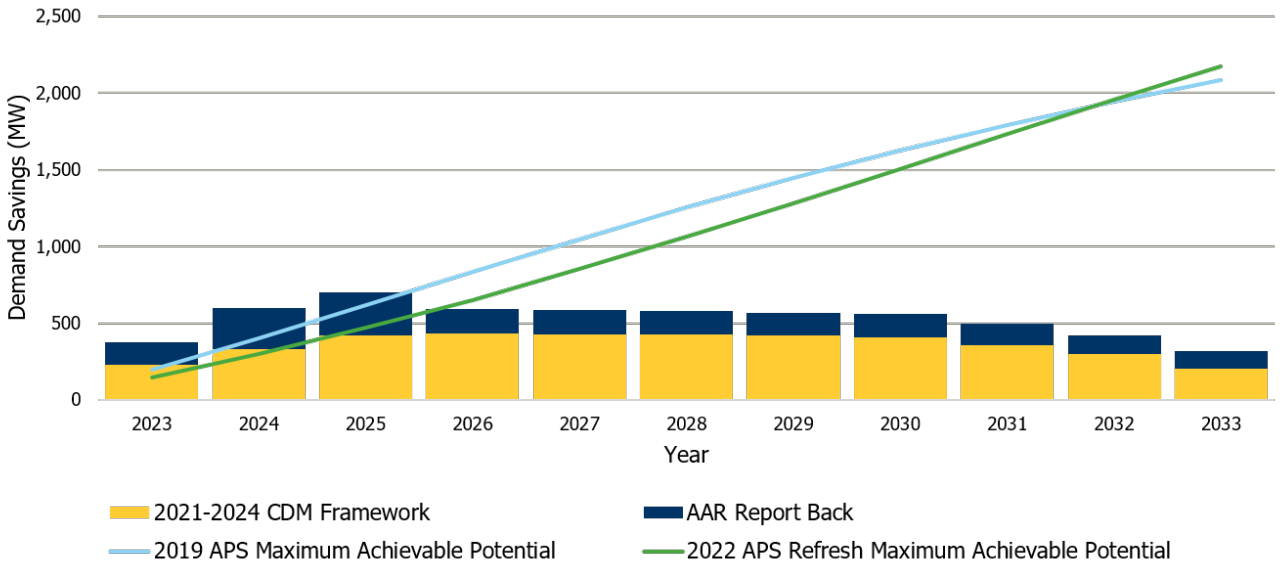
In presenting the 2022 APS refresh results, it is important to acknowledge ongoing sector discussions about the impact of electrification (and other factors) on demand and the eligibility of natural gas generation in future IESO resource procurements, subjects which the IESO is exploring in the parallel P2D report. Should actual demand exceed the 2021 APO reference forecast and/or natural gas generation be excluded from future procurements, the quantity of cost-effective achievable potential in Ontario would almost certainly increase above the 2022 APS refresh estimates.

### 2.5.2 Comparison of 2019 APS and 2022 APS Refresh Provincial Results and Targets

The APS refresh potential for energy and peak demand savings is moderately lower than the 2019 APS in the initial years and significantly higher over the remaining 20-year forecast period. As illustrated in Figures 10 and 11, when compared against committed savings from the 2021-2024 CDM Framework and AAR report back over the next 10 years, the APS refresh confirms that there is a significant opportunity to increase the contribution of CDM to reliability and affordability through increased targets and budgets following the current Framework.

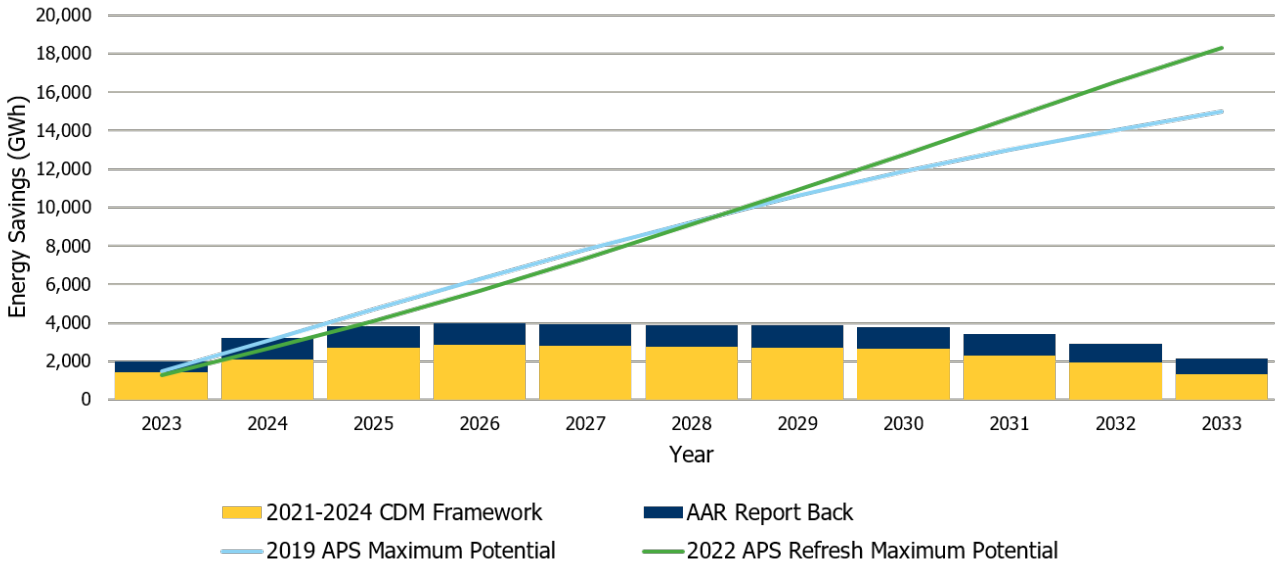
[6] Specifically, the refresh updated the unconstrained maximum achievable potential scenario (Scenario B).

**Figure 10 | Comparison of Forecasted Achievable Peak Demand Savings Potential and Committed Savings**




The APS refresh estimates that there is 1,063 MW of achievable peak demand savings potential in 2028, 485 MW above current committed savings; and 2,171 MW in 2033, 1,851 MW above current committed savings. The significant decrease in demand savings from the AAR report-back programs between 2025 and 2026 reflects the assumption that there is no further investment in the residential demand response program after 2025 and, as such, that the program would be discontinued. The APS refresh indicates that there is achievable demand savings potential available across all sectors, with 31% coming from residential, 49% from commercial and 21% from industrial customers.

**Figure 11 | Comparison of Forecasted Achievable Energy Savings Potential and Committed Savings**



The APS refresh estimates that there is 9.1 TWh of achievable energy savings potential in 2028, 5.2 TWh above current committed savings; and 18.3 TWh in 2033, 16.1 TWh above current committed savings. The refresh indicates that achievable energy savings potential is also available across all sectors, with 27% coming from residential, 52% from commercial and 21% from industrial customers.

In the near term, combined committed savings from the 2021-2024 CDM Framework and AAR report-back programs realize the full 2022 APS refresh estimate of achievable potential in 2025 and tap into the demand response potential revealed by the IESO's Distributed Energy Resource Potential Study. The IESO is confident that committed savings can be achieved based on recent program experience and market consultation, which has not been reflected in the 2022 APS refresh updates, and that these committed savings will contribute to addressing mid-decade capacity needs. Following the term of the current Framework, there is significant opportunity for additional CDM investment to continue cost-effectively addressing system needs.

Increasing spending from federal programs in the market (i.e., the Canada Greener Homes Grants and Green Municipal Fund) may be competing for some of the savings potential; however, as these programs reflect different policy objectives, they are not necessarily designed to target the electricity measures identified as cost-effective in this Mid-Term Review. Where possible, federal programs are considered when designing new programs in order to avoid duplication and opportunities for collaboration are sought as new initiatives are announced.

# 3. Customer Needs Review

The objective of the customer needs review is to assess consumer needs in Ontario and the alignment of these needs with the objectives of the 2021-2024 CDM Framework. The review aimed to gain broad insight into marketplace experience with current Save on Energy offerings, the impact of the COVID-19 pandemic on the priorities of both residential and business consumers and the motivators and drivers of the consumer-driven shift toward decarbonization.

To ensure that a broad perspective was considered, the IESO engaged directly with the marketplace through public stakeholder engagement and targeted outreach. It also undertook primary market research activities and anchored findings against a jurisdictional scan to understand how trends in Ontario aligned with other jurisdictions. The outcomes of these activities reinforced key themes that emerged consistently across customer segments (see Appendix 3 for further details on marketplace outreach).

## 3.1 Key Findings

The impact of COVID-19 and related supply chain disruptions continue to affect customer progress with CDM projects as customers shifted their focus away from energy efficiency to other priorities (e.g., implementing further health and safety measures) or were unable to secure components of, or entire, energy-efficient technologies. This trend was even more pronounced for the income-eligible customer segment as well as for First Nations communities, where individuals and communities were heavily affected by provincial health and safety mandates at various points throughout the pandemic. The ability to manage costs, which has been compounded by rising inflation rates, was also identified as an issue for income-eligible and First Nations communities.

A push for consumer-driven solutions was also a key finding through the customer needs review. This includes both an increasing focus on achieving decarbonization goals and a desire for more flexible, tailored and customized CDM programs to meet local needs. This is supported by expressed sentiment that consumers would benefit from a more reliable funding commitment than the current four-year Framework approach to allow for longer-term energy-efficiency project planning, alignment across energy-efficiency funding sources and additional capability-building support to enable the implementation of projects with deeper savings. Enhanced customer awareness was also identified as important to encourage participation in programs and maximize potential.

The research also found that jurisdictions across North America, including Ontario, are increasingly focused on supporting equity, diversity and inclusion (EDI) practices in program design and delivery to ensure equitable access to programs and to promote a diverse workforce. The IESO is committed to continuing to learn and understand barriers to participation in energy efficiency and to ensuring broad and equitable access to CDM programs in Ontario.

## 3.2 Key Themes

Twelve key themes emerged from the customer needs review activities through stakeholder engagement, outreach and jurisdictional research activities. These themes emerged consistently across customer segments (see Table 2).

**Table 2 | High-Level Summary of Customer Needs Review**

| Key Theme | Summary |
|---|---|
| COVID-19 recovery | The COVID-19 pandemic continues to have an impact on consumers and communities across Ontario that shifted their focus to implementing health and safety measures. These challenges are further compounded by supply chain disruptions, cost increases due to inflation and the fact that organizations are focused on core business priorities rather than undertaking energy-efficiency projects. |
| Decarbonization | Consumers are placing a high priority on meeting greenhouse gas (GHG) reduction targets and pairing energy efficiency with electrification, both of which have impacts on and opportunities for consumers and the grid. Consumers, municipalities and businesses are receptive to adopting new electricity products and services, particularly those that help to manage costs. |
| Customer-based solutions | Customers are seeking program flexibility to meet their needs in the form of tailored programs for specific business/industry segments. |
| Longer-term funding Commitments | The current funding approach – the "start and stop" model – creates barriers; a reliable funding stream is required to enable longer-term energy-efficiency project planning. Customers and partners also reported confusion resulting from the changing of frameworks and resulting program changes. |
| Opportunity to address local needs | There is an opportunity for targeted CDM to play a larger role in supporting localized system needs. Current processes lack the flexibility required to effectively respond to fast-evolving planning needs. |
| Continued collaboration with LDCs | LDCs continue to advocate to play a larger role in the delivery of CDM. (See the Local Distribution Company Collaboration Opportunities section.) |
| Enhance measure offerings | Opportunities were identified to enhance the Save on Energy portfolio with additional program measures (e.g., additional lighting and controls, and air- and ground-source heat pumps). |

| Key Theme | Summary |
|---|---|
| Building capacity and going deeper | Customers are looking for increased investment in capacity-building initiatives to further their ability to undertake efficiency projects beyond lighting – e.g., installation of deep retrofits, electrification projects, net-zero approaches, distributed energy resources (DERs) and strategic energy management. |
| Enhanced consumer awareness | Improved awareness of the value of energy efficiency and the opportunities is needed to encourage increased participation in programs and maximize savings. It is critical to educate the public both broadly and in varying ways on the value of energy efficiency and how to install the most efficient technologies in homes and businesses. Community-based partnerships should also be considered to broaden awareness and participation in programs. |
| Alignment across energy-efficiency funding sources | Better coordination is needed across different actors in the market (e.g., Enbridge and the federal government) to decrease marketplace confusion and maximize rebate offerings to meet customer needs (e.g., incentive stacking). |
| Income-eligible and First Nations communities | Income-eligible and First Nations communities would like the IESO to continue to engage with the sector to help better understand the needs of these participants and to create appropriate strategies to assist them. A need that has been identified is to explore non-digital outreach tactics to ensure that income-eligible First Nations community members are aware of the programs. (See the Program Review section for further details on Support Programs including observations and recommendations) |
| Increased focus on EDI | Jurisdictions across North America are increasingly more focused on EDI in program design and delivery to ensure equitable access to programs and to promote a diverse workforce |

Themes identified through the customer needs review were taken into consideration when developing the AAR report back regarding incremental conservation opportunities as well as the program review component of the Mid-Term Review.

# 4. Program Review

This section summarizes IESO's review of the progress and impact of CDM programs, including for low-income, income-eligible and on-reserve First Nations consumers. The program review consisted of the following key tasks:

- An assessment of the performance of current IESO CDM programs, including a review of the outcomes of the customer needs review.
- A consideration of opportunities for enhancing current and planned programs.
- The development of an updated forecast, based on projected performance for the remaining period of the CDM Framework (2023-2024).
- A review of programs offered outside of Ontario, in comparable jurisdictions.

## 4.1 Key Findings

New and enhanced programs in the 2021–2024 CDM Framework were generally well received by the market. However, all programs were negatively affected by the COVID-19 pandemic and related measures, which disrupted the capability to deliver programs as well as customers' ability to participate.

For commercial and industrial customers, the loss of the Retrofit Program's Custom Track and the Process and Systems Upgrade Program resulted in lost short-term opportunities and customer dissatisfaction. Under the current Framework, programming targeting the residential sector was restricted to only income-qualified and Indigenous customers; however, research indicates that cost-effective mass market residential opportunities are available.

Jurisdictional research indicates that Ontario has fallen behind comparable jurisdictions in terms of spending on energy efficiency and leveraging corresponding savings. Collaborations with Enbridge and Natural Resources Canada (NRCan)[7] continue to help program participants find more savings and to reduce IESO administrative costs. Currently, regulatory and funding cycles of the IESO and Enbridge are not aligned, which presents some challenges for collaborative programing.

The program needs review reiterated and reinforced findings from discussions with customers about their needs (see Table 2). As noted in Appendix 7, CDM program administrators in other jurisdictions are evolving their program portfolios to respond to changing customer requirements and expectations, including around decarbonization, EDI, capacity building and deeper savings opportunities.

[7] Collaboration with Enbridge includes the Energy Affordability Program, the midstream Food Distributor Program, and Capability Building initiatives; collaboration with NRCan includes the Energy Manager Program.

## 4.2 Summary to Date

### 4.2.1 Challenges in Operationalizing the 2021-2024 CDM Framework

#### 4.2.1.1 Managing Overlapping Frameworks

The IESO currently manages the completion of outstanding projects that were entered into under two legacy frameworks (the 2015-2019 Conservation First Framework and the 2019-2020 Interim Framework) as well as the current Framework. With each new framework, significant effort is needed to relaunch and/or redesign programs and either extend or re-procure third-party program services, along with increased administrative efforts to track three separate budgets and targets. These activities create certain inefficiencies implicit to the start-and-stop nature of time-bound frameworks.

For example, under the Retrofit Program, shifting from the Interim Framework to the 2021-2024 CDM Framework, in which the IESO changed its focus from energy savings to peak demand savings, caused a spike in customer applications for the outgoing program, exceeding the available budget. This led to material administrative and budget impacts, including using the new program's budget to cover demand for the outgoing program to avoid consumer frustration and disappointment. As a result, there was a reduction in the current Retrofit budget from the start of the Framework. From a vendor perspective, the IESO faced challenges in using existing vendor contracts in which incremental needs were outside of existing contract scopes. This led to increased inefficiencies and delays to updating programs to get them in-market.

#### 4.2.1.2 The Impact of COVID-19

The COVID-19 pandemic and related measures had a material impact on the IESO's ability to deliver its planned programming and on customers' receptiveness to implementation over the review period. The IESO identified the following impacts on CDM program offerings and uptake due to the COVID-19 pandemic:

- Provincial lockdowns and supplemental safety protocols disrupted program delivery.
    - Launch dates for some programs were delayed, while others were paused. For some programs, administrative costs still accrued despite not delivering savings due to requirements to maintain call centre and other capabilities.
- Participants managing uncertainty and shifting budget priorities reduced the number and timing of energy-efficiency projects.
    - Industries also experienced challenges related to staffing and site access.
- Supply chain issues and inflation affected energy-efficiency projects, along with related increased time/costs/complexity for implementation.
- Changes to energy-use patterns introduced challenges to project measurement and verification for participants and program administrators.
    - This led to increased program administrative costs along with decreased savings certainty.

### 4.2.2 In-Market Program Status (Business Programs)

The 2021-2024 CDM Framework currently delivers six business programs. Each program targets a specific market, either by customer or measure type.

#### 4.2.2.1 Retrofit Prescriptive

Offers financial incentives for equipment upgrades that reduce electricity consumption for a variety of commercial, institutional and industrial sectors.

**Alignment/need:** Maintained incentives for commonly implemented measures for customers.

**Delivery status:** Energy savings are ahead of forecast; however, the program is forecasted to exhaust its budget in 2023. The Retrofit Prescriptive Program continues to be mainly a lighting-driven program. The implementation of a prescriptive-only model reduced administration costs for the IESO by nearly 50 per cent on a per-kWh basis and shortened approval timelines for customers.

#### 4.2.2.2 Energy Manager

Offers incentives to employ an energy manager focused on improving energy performance.

**Alignment/need:** Provided continuity for existing energy managers in the program. Historically has influenced a significant level of participation in other Save on Energy programs such as Retrofit, Process and Systems Upgrade and Energy Performance.

**Delivery status:** Focus shifted to peak demand savings, and a new, five-year term limit for participants was imposed. After 10 years in-market, the program is ending after the 2022 contract year with the transition to a new Strategic Energy Management model to improve cost-effectiveness and increase the long-term impact on participant organizations. Majority of planned participants enrolled in 2022; program is fully subscribed, with 50 energy managers.

#### 4.2.2.3 Energy Performance

Pay-for-performance model to encourage whole-building energy performance against a baseline model.

**Alignment/need:** Offers a low-touch, self-directed offering to customers. Allows more sophisticated customers to deliver savings in any way they deem to be effective for their organizations and facilities, based on an established energy baseline.

**Delivery status:** Relaunched with new peak demand incentive, three year pay-for-performance period and upfront incentive support. Number of applications received to date exceeds the IESO forecast. Demand incentive uptake is lower than forecasted due to participants' concerns with increased modelling requirements.

#### 4.2.2.4 Small Business

Offers small businesses direct-install incentives to invest in energy-efficient equipment upgrades.

**Alignment/need:** Allows the IESO to reach smaller customers that would not normally undertake energy-efficiency projects. Builds on historical Small Business Lighting Program with the addition of selected non-lighting measures.

**Delivery status:** Out of market for approximately nine months in 2021 due to COVID-19 and relaunched as soon as restrictions lifted. The IESO and Enbridge collaboration is under consideration with a long-term objective of enabling an expanded program that will deliver administrative-cost reductions.

#### 4.2.2.5 Industrial Energy Efficiency

Offers industrial customers incentives to improve energy efficiency of their industrial processes and to implement system optimization projects.

**Alignment/need:** Addresses a gap in the current offerings. Intended to allow for large, high-savings projects to apply through a structured, competitive process.

**Delivery status:** Designed with stakeholder feedback to meet the needs of Ontario's large industrial sector. First application window closed September 30, 2022.

#### 4.2.2.6 Local Initiatives

Competitive procurements of CDM projects that reduce demand and/or energy to meet targeted local needs.

**Alignment/need:** Allowed CDM funding to target specific needs across the province.

**Delivery status:** Early responses suggest some challenges related to identifying non-duplicative program opportunities and cost-effective programs given limited budgets.

### Current Performance and Forecast to the End of the Framework

In spite of the unprecedented challenges that occurred as a result of the COVID-19 pandemic, the IESO has continued to work diligently to deliver the 2021-2024 CDM Framework. Based on the original 2021-2024 CDM Framework Plan estimates, the IESO expects to utilize 100 per cent of the original CDM Program Plan's business budget to achieve 76 per cent (314 MW) of the demand-reduction target and 97 per cent (2.4 TWh) of the energy-savings target. The larger shortfall in the demand-reduction forecast compared to energy-savings forecast is a result of a high volume of horticultural lighting projects – which provide limited contribution to summer peak demand reduction – and the use of the 2021-2024 CDM Framework budget to satisfy overflow needs from the previous energy-focused framework.

Table 3 outlines the IESO's updated forecast (as of November 2022) against its January 2021 CDM Framework Program Plan for Business Programs.

**Table 3 | CDM Program Plan for Business Programs**

| 2021-2024 CDM Program Plan (as of January 2021) | Administrative Budget ($M) | Incentive Budget ($M) | Demand Savings (MW) | Energy Savings (TWh) |
|---|---|---|---|---|
| Business | $88 | $369 | 410 | 2.5 |
| **Updated forecast on January 2021 2021-2024 CDM Program Plan (as of November 2022)*** | **Administrative Budget ($M)** | **Incentive Budget ($M)** | **Demand Savings (MW)** | **Energy Savings (TWh)** |
| Business | $80 | $376 | 314 | 2.4 |

**Note:** Values may not add up precisely due to rounding.

* The January 2021 version of the CDM Program Plan does not include incremental enhancement and AAR programs directed by the government in October 2022.

The October 2022 Directive to pursue AAR proposals to help address emerging system needs in 2025 and beyond better enables the IESO to pursue savings opportunities. In addition, the IESO will be implementing enhancements to the Framework, capturing additional opportunities for peak and energy savings to close the gap to reach or exceed savings targets.

### 4.2.3 Planned New Programs in the 2021-2024 CDM Framework

For the second half of the 2021-2024 CDM Framework, there are a number of planned business programs scheduled to launch in 2023, in addition to those covered under the October 4, 2022, Directive. Table 4 outlines the new programs in the CDM Plan that are scheduled to launch in 2023.

**Table 4 | New 2021-2024 CDM Framework Programs Scheduled to Launch in 2023**

| Program | Description | Alignment/Need | Status |
|---|---|---|---|
| Existing Building Commissioning | Incentives for building recommissioning activities that target operational and maintenance savings. | Strong desire and established professional capacity for building commissioning support in Ontario. | Planned launch delayed from 2022 to 2023.<br><br>Designed with extensive stakeholder feedback. Refinement of program estimates indicates slightly lower savings target than previously planned. |
| Strategic Energy Management | Facilitates continuous improvement approach to reducing energy waste by embedding energy-management practices across organizations. | Many jurisdictions moving to cohort-based program for broader energy-management support coverage.<br><br>Evolution of the Energy Manager Program, which ends in 2022. | Planned launch in 2023.<br><br>Refinement of program estimates indicate slightly lower savings target. |
| Custom Lighting | Incentives for customers to go beyond 1:1 lighting replacements and target improved design and more sophisticated control strategies. | Studies indicate considerable achievable lighting potential beyond 1:1 lighting retrofits. | Will be incorporated into the Retrofit Program in 2023. |
| Midstream Lighting | Lighting incentives directed toward lighting distributors to increase sales of energy-efficient lighting through point-of-sale discounts, improved energy-efficiency product stocking, marketing and distributor training. | Distributor-targeted lighting-incentive programs are prevailing approaches being taken to reduce participant barriers and lower the cost of lighting programs in many jurisdictions. | Majority of current general lighting incentives offered through the Retrofit. Program will be moved to the midstream distributor channel in 2023 to reduce participation barriers and administrative costs. |

## 4.3 Gap Analysis (by Sector) in the Current Framework Portfolio

By design, the majority of CDM Framework spending and activity occur within the business sector (i.e., the commercial and industrial sectors). The discontinuance of the Retrofit Program's Custom Track and the Process and Systems Upgrade Program are noted gaps communicated by customers.

Under previous frameworks, CDM included a variety of mass-market programs targeting residential customers (see the Mass Market Programs and Awareness section in Appendix 5 for more details). However, with the more limited system needs anticipated when the 2021-2024 CDM Framework was designed and the IESO APS indicating fewer (and costlier to access) opportunities in the residential sector, the policy direction resulted in the elimination of residential incentive programs. Since 2019, IESO programming for the residential sector has only served income-qualified and Indigenous customers. The historical savings-to-sales ratio[8] and the results of the APS refresh exercise[9] suggest that significant opportunities for cost-effective mass-market programs exist.

Industrial customers continue to be able to access the Retrofit Program and the Industrial Energy-Efficiency Program, which offers custom solutions for larger industrial facilities.

Agricultural customers also continue to be able to access the Retrofit Program; however, there remains a significant opportunity to further address regional capacity needs arising from indoor agriculture in Southwestern Ontario. Over the first two years of the Framework, there has been significant demand from the greenhouse sector for horticultural lighting incentives, which drive high energy savings beneficial to managing grid constraints in Southwestern Ontario. However, this strong demand is forecasted to exhaust the Retrofit Program budget in 2023, which will shut down the program for new applicants.

The subsections below provide additional detail on gaps and opportunities by specific sectors.

### 4.3.1 Residential

Current program options are limited to income-qualified customers through the Energy Affordability Program and to First Nations communities through the First Nations Community Building Retrofit Program (FNCBRP) and Remote First Nations Energy Efficiency Program (RFNEEP).

**Opportunities:**

- Residential HVAC (heating, ventilation and air conditioning) is an underutilized resource that could be leveraged via demand response to address peak demand.
- Weatherproofing, HVAC tune-ups, smart-home technologies, heat pumps, deep retrofits and targeted multi-family social housing offerings are options to incentivize more efficient energy use to residential customers.

[8] See Appendix 7: Jurisdictional Benchmarking Exercise, Figure A7.3 for a comparison of residential energy-efficiency savings versus utility-level residential energy consumption across jurisdictions.
[9] See the APS refresh for more information.

- Focused offer for multi-residential buildings will simplify application processes (currently, common areas can apply to the Retrofit Program, while income-qualified customers can access the Energy Affordability Program for in-suite measures).

### 4.3.2 Commercial

Many customers are well served by business programs, including the Retrofit Program, Small Business Program, Energy Manager Program/Strategic Energy Management Program, Existing Building Commissioning Program and the Energy Performance Program.

**Opportunities:**

- Regionally targeted savings would maximize system benefits and defer transmission investments.
- New-construction programs could present an opportunity to build efficiently from the start.
- Support for efficient electrification, net zero, electric vehicles and DERs and deep retrofits to target GHG reductions are areas that new program offerings could support.
- The market could use additional support for advanced- and connected-controls systems.
- As light-emitting diode (LED) lighting increasingly becomes the standard, incentives for lighting measures will be less necessary and will deliver less savings opportunity. Consequently, continuing to explore non-lighting prescriptive measures for future energy-efficiency opportunities is important.
- Increased targeted marketing and outreach will broaden awareness of existing and planned new programs, as well as capability-building initiatives; this includes the use of traditional marketing channels such as print and radio.

### 4.3.3 Industrial

Industrial customers can access business programs for support, including the Retrofit Program, Energy Manager Program, Energy Performance Program and the new Industrial Energy Efficiency Program.

**Opportunities:**

- Support for large, custom projects including industrial decarbonization/electrification can be further developed.
- Growth forecast for new large loads suggests that industry-specific programming to target key economic/growth sectors (e.g., mining, electronics) could be a benefit.
- Increased targeted marketing and outreach will broaden awareness of existing and planned new programs, as well as capability-building initiatives.

### 4.3.4 Agricultural

Greenhouse LED lighting incentives are currently available through the Retrofit Program.

**Opportunities:**

- Increased funding for LED lighting and equipment controls targeted at west-of-London greenhouses could help mitigate the rate of demand growth and allow more new customers to connect to a constrained grid.
- Incentives for BTM DERs can free up more grid capacity in the region.
- Increased targeted marketing and outreach will broaden awareness of existing and planned new programs, as well as capability-building initiatives.

## 4.4 Support Programs: Income-Eligible and Indigenous Programs

### 4.4.1 In-Market Program Status (Support Programs)

The IESO has offered dedicated energy-efficiency programs targeting the income-qualified sector as well as on-reserve First Nations for more than a decade, with the objective of supporting equitable access to energy-efficiency programming and energy affordability. The design and delivery of these programs take into consideration the unique participant experiences of these sectors and are based on insights learned through the delivery of past programs, market research and conversations with communities, social service organizations and other interested stakeholders.

The Save on Energy programs currently available to support these priority customer segments are as follows: [10]

- **Energy Affordability Program (EAP):** Launched in 2021, the EAP provides support to income-eligible electricity consumers by helping them lower their monthly electricity costs and increase their home comfort. New to the EAP is a kit offering for moderate-income households. In 2022, the IESO further improved the program through a collaboration with Enbridge that resulted in a one-window delivery approach to improve the customer experience, leverage economies of scale and respond to stakeholder feedback in support of collaboration between electricity and natural gas conservation. The EAP is available to on- and off-reserve First Nations and Métis community members who meet the eligibility criteria.
- **FNCBRP:** Launched in July 2022, the FNCBRP provides funding and technical support to on-reserve First Nations communities to undertake energy-efficiency projects. These projects are intended to help communities improve the energy efficiency of their band-owned commercial and institutional facilities, manage their electricity use more effectively and save on energy costs. A stakeholder engagement with First Nations community members informed the design of the program.

[10] Programs supporting income-eligible and First Nations communities are key initiatives listed in the 2020-2025 Ontario Poverty Reduction Strategy.

- **RFNEEP:** The RFNEEP provides support to remote First Nations communities that are connected, or planned to be connected, to the IESO grid to implement energy-efficiency projects that will help them manage energy use more effectively to save on energy costs and increase the comfort of their homes and businesses. With transmission connection on its way to these remote communities, now is an ideal time to build awareness about the benefits of energy efficiency. The first RFNEEP community-launch events occurred in August 2022 and continue to be held as more communities engage in the program. The RFNEEP follows a pilot program that served four remote First Nations communities under the Interim Framework key learnings around measure selection and community engagement were incorporated into the RFNEEP.

In addition to these programs targeted at energy efficiency, the IESO also delivers energy-support programs for First Nations and Métis communities, with the objective of community building and enabling greater participation in the electricity sector. One of these programs, the Community Energy Champion (CEC) Program, provides funding support to hire a designated community energy champion to help plan, implement and evaluate energy-related priorities. The Save on Energy First Nations programs outlined above work in tandem with the CEC Program to help communities determine the best energy solutions to fit their needs.

### 4.4.2 Current Performance and Forecast to the End of the Framework

The COVID-19 pandemic had a significant impact on the IESO's ability to deliver support programs. Individuals and communities were primarily focused on the health crisis and were heavily affected by provincial health and safety mandates at various points throughout the pandemic. This limited the ability for IESO's service delivery vendors to enter people's homes, engage communities and complete projects. In addition, supply chain issues affecting appliance and equipment availability further impaired the IESO's ability to complete projects. These factors contributed to lower-than-expected program performance across all support programs in the first half of the Framework. Based on the original 2021-2024 CDM Framework Plan estimates, the IESO expects to utilize 64 per cent of the original CDM Program Plan's support program budget to achieve 53 per cent (16 MW) of the demand-reduction target and 55 per cent (0.1 TWh) of the energy-savings target (see Table 5).

**Table 5 | CDM Program Plan for Support Programs**

| 2021-2024 CDM Program Plan (as of January 2021) | Administrative Budget ($M) | Incentive Budget ($M) | Demand Savings (MW) | Energy Savings (TWh) |
|---|---|---|---|---|
| Support | $44 | $148 | 30 | 0.2 |
| **Updated forecast on January 2021 2021-2024 CDM Program Plan (as of November 2022)*** | **Administrative Budget ($M)** | **Incentive Budget ($M)** | **Demand Savings (MW)** | **Energy Savings (TWh)** |
| Support | $16 | $105 | 16 | 0.1 |

* The January 2021 version of the CDM Program Plan does not include incremental enhancement and AAR programs directed by the government in October 2022.

The current status of the Support Programs is as follows:

- **EAP:** Following the launch of the EAP in January 2021, there was a temporary suspension of audits and installations in response to public health and safety guidelines. Until spring 2022, the program experienced lower-than-expected participation volumes, in part due to apprehension about the in-person home visits associated with the program offering. With the evolving public health situation and as public health and safety restrictions are lifted, enrollments are increasing and are expected to continue to improve through the remainder of the 2021-2024 CDM Framework. Despite the challenges brought about by the COVID-19 pandemic, overall, the EAP is meeting or exceeding participant expectations 77 per cent of the time, based on participant satisfaction surveys.
- **FNCBRP:** The FNCBRP launched in summer 2022 and already has commitments from more than 10 First Nations communities to participate. The IESO forecasted that approximately 70 communities would participate over the course of the 2021-2024 CDM Framework and continues to anticipate that this will be achieved based on the interest expressed to date.
- **RFNEEP:** The remote First Nations communities that are eligible to participate in the RFNEEP were largely focused on responding to the pandemic throughout 2021 and the early part of 2022. In light of ongoing community lockdowns, the IESO suspended community engagement activities until spring 2022. Since initiating community engagement activities, there has been a positive response from these communities, with five of 12 eligible communities committed to participating in the first phase of the program in 2022/2023. Because of the positive impacts anticipated to be made in these communities, the IESO expects the remaining seven communities to participate in the second phase of the program in 2023/2024.
- Due to ongoing public health restrictions experienced in 2020, a portion of the 2021 budget was allocated to the completion of projects in the First Nations Conservation Program and the Remote First Nations Pilot Program offered under the Interim Framework.

For the latter half of the Framework, the IESO will focus on opportunities to continue to improve these program offerings based on lessons learned and feedback from participants, communities and social service organizations.

### 4.4.3 Program Gaps and Opportunities (Support Programs)

Through conversations with participants, communities and interested stakeholders, as well as through the collection of market research, several barriers to participation in the support programs have been identified, as well as opportunities for enhancements.

#### 4.4.3.1 Energy Affordability Program

The main barriers to participation in the EAP were noted to be a lack of awareness about the offering and ambiguity around how, or if, a household would qualify. In addition, about 75 per cent of households expressed having more pressing concerns and/or expenses to address, which limited their ability/motivation to seek energy-efficiency opportunities to reduce energy costs. This barrier was more pronounced in low- than in moderate-income households.

These market research findings were further supported through direct feedback:

- Participation is low due to lack of awareness of the program offering; this includes on-reserve First Nations and Métis communities.
- Customers indicated that current measures are not making a significant enough impact on electricity bills; as well, they would like to have more choice in terms of the measures available to them.
- Income-eligible households indicated that they had experienced a lack of time to investigate program offerings.
- The application process and eligibility qualifications are unclear and create a barrier to participation.

Language and digital limitations were identified as barriers to participation in Northern communities.

**IESO Opportunities**

Program market research indicates that there is a significant opportunity and need within income-eligible households for the EAP, as only 12 per cent of low-income and 9 per cent of moderate-income households have participated in the program. The following enhancements are therefore being considered for the remainder of the Framework:

- Examine eligibility thresholds to determine if adjustments are required to address inflation.
- Implement an enhanced program-marketing strategy – for both comprehensive and energy-saving kit program offerings – to enable greater awareness and participation in the program. As part of this, additional outreach channels will be considered, such as targeted print and radio advertisements.
- Address language barriers by operating program call centres in 10 languages and translating program collateral into multiple languages (including Ojibway, Cree and Oji-Cree).
- Add air-source heat pumps to the EAP for electrically heated homes; this would be the most significant energy saving enhancement and will provide meaningful savings to participants most in need of assistance. The IESO intends to utilize the existing program budget, investing up to $40 million in this measure for electrically heated homes.

#### 4.4.3.2 Remote First Nations Energy-Efficiency Program and First Nations Community Building Retrofit Program

Given the recent launch of both of the RFNEEP and the FNCBRP in summer 2022, observations on program performance are limited. However, in the design of the new programs, consideration was given to past feedback. In March 2018, the IESO reviewed Indigenous programming in the study Indigenous Conservation Programming: A New Approach, Report on Energy Conservation for First Nations and Métis in Ontario, which was based on outreach efforts through online surveys and in-person engagements (see Appendix 5). Some of the recommendations are no longer relevant, however, given the transition to a central delivery model and the discontinuation of the Green Ontario Fund. One key recommendation from this study that has not been implemented is the formation of a joint advisory committee incorporating First Nations leadership. This recommendation will be explored further in the future.

**IESO Opportunities**

The following enhancements are being considered for the remainder of the Framework:

- Partner with Indigenous-owned and -operated organizations that have existing community relationships to support community engagement and outreach strategies.
- Scale up the rate of delivery as community interest allows, and act quickly when communities are engaged.
- Leverage positive experiences and testimonials from participating communities to build trust and generate interest within communities planned to be served in the second phase of delivery.
- Explore collaboration opportunities with Enbridge to coordinate outreach and delivery with the FNCBRP.
- Consider increasing the number of facility audits and expanding building eligibility to allow for additional building types (e.g., social housing building) in the FNCBRP.

The IESO will focus on opportunities to continue to improve these program offerings in the second half of the 2021-2024 CDM to support the achievement of participation goals and meet the needs of participants.

### 4.4.4 Near-Term Opportunities

The IESO projected in its 2021 APO that there would be a need for additional electricity capacity beginning in 2025, and the 2022 AAR identified necessary actions to ensure system reliability, including new energy-efficiency programs. The government accepted the IESO's recommendation for new and expanded energy-efficiency programs, which are among the lowest-cost ways of meeting system needs. The programs are expected to be available to eligible electricity customers beginning in early 2023.

The IESO will pursue key opportunities through the implementation of AAR report-back programs in 2023:

- **Residential demand response**: Using existing smart thermostats to reduce air-conditioning loads on hot summer days.

- **Retrofit Program incentives for custom measures:** Fixed incentive rates for savings from complex and large projects; available to all business customers.
- **Enhanced LIP:** Allowing regional incentive adders to existing programs and flexibility for including incentives for BTM DERs, such as generation and storage as a non-wires alternative.
- **Targeted Greenhouse Program:** Incentive to install more-efficient lighting, controls and BTM DERs in Southwestern Ontario.

The new/enhanced programs will address customer needs that were identified in the customer needs review as well as the program gaps identified above. All four programs enhance measure offerings. The reintroduction of the Retrofit Program's Custom Track will enable consumers to pursue deeper savings opportunities that cannot currently be incentivized as a prescriptive measure.

Both the Targeted Greenhouse Program and Enhanced LIP demonstrate how targeted CDM programs are an opportunity to address local needs and, by including incentives for BTM DER, will enhance measure offerings, enable consumers to pursue deeper savings opportunities and support decarbonization needs. The Targeted Greenhouse Program also responds to the need for more sector-tailored, customer-based solutions. By offering a targeted Greenhouse program, the Retrofit program can continue to operate and deliver higher peak savings.

## 4.5 AAR Report-Back Programs Summary

### 4.5.1 Residential Demand Response

Province-wide demand response program targeting residential customers with central air conditioning and installed smart thermostats.

Bring Your Own Device Program: Households with installed smart thermostats are paid an annual incentive in return for allowing the IESO to reduce their cooling load on a select number of summer afternoons to reduce peak demand.

**Alignment/need:** Provides a residential program offering. Demand-focused program for system benefits.

**Delivery status:** Program design is finalized and the IESO is in the process of procuring a third-party vendor to operationalize the program. Targeting spring 2023 as the go-live date.

### 4.5.2 Retrofit Custom

A fixed incentive rate for savings from custom energy-efficiency projects available to business customers across Ontario; offered as a $/kW or $/kWh rate.

**Alignment/need:** Addresses customer need/request to bring back this custom program.

**Delivery status:** Program design finalized. Implementing administrative changes internally and with third-party vendors. Targeting spring 2023 as the go-live date.

### 4.5.3 Enhanced LIP

Enhancements to existing LIP, including regional incentive adders to province-wide programs and flexibility for including incentives for BTM DER solutions, such as generation and storage.

**Alignment/need:** Addresses local-area needs/constraints. Addresses needs identified around the challenges for finding non-duplicative measures.

**Delivery status:** Reviewing target areas recommended from regional planning to identify opportunities. Targeting Q1 2023 as the go-live date.

### 4.5.4 Targeted Greenhouse Program

Targeted regional program in Southwestern Ontario for greenhouse growers to install LED lighting and controls for greenhouse energy systems, with an option to include incentives for BTM DERs, such as combination solar generation and battery storage.

**Alignment/need:** Addresses local-area needs/constraints. Offers specialized support for a sector of concern.

**Delivery status:** In service. Retrofit incentives continue to be offered for LED grow lights and will be expanded over time to include controls and DER options.

These four programs will help address the following issues, which were identified in the 2022 AAR: 1) growing province-wide capacity and energy needs; 2) emerging regional needs; and 3) expansion of agricultural greenhouses in Southwestern Ontario. Details of programs are contained in Appendices 5 and 6.

While the main program opportunities for the second half of the 2021-2024 CDM Framework have been identified through AAR report-back programs, the IESO has identified additional program improvements that can be operationalized during the remainder of the current Framework that will modestly improve the forecast.

As discussed in the Support Programs subsection, the most significant enhancement is the proposed addition of air-source heat pumps to the EAP, which provides savings to participants most in need of assistance. The IESO plans to utilize existing program budget, investing $40 million in this weatherization measure for electrically heated homes. In addition, other changes are being proposed for the Small Business Program and the FNCBRP, including exploring potential collaborations with Enbridge to raise awareness and share costs for deeper savings. The IESO will continue to review and update the measures list for the Retrofit Prescriptive Program and the Small Business Program to better serve customer needs and contribute to system needs.

## 4.6 Updated 2021-2024 CDM Framework Program Plan

With the October 4, 2022, Directive, the IESO is updating the 2021-2024 CDM Framework Program Plan. The updated Plan (see Table 6) will set targets at 725 MW of demand savings and 3.8 TWh of energy savings, with a total budget of $1.034 billion. The total portfolio of AAR enhancements is budgeted at $342 million through 2024 and results in a total incremental peak demand reduction of 285 MW and annual energy savings of 1.1 TWh by 2025. The budget relief provided by the AAR's Targeted Greenhouse Program allows the Retrofit Program to remain available and to exceed its previous demand savings target by 70 MW. These new investments provide a total net system benefit of $312 million[11] in support of attracting economic investment, providing solutions to regional load constraints and facilitating energy cost–savings opportunities for Ontario ratepayers.

**Table 6 | Updated CDM Program Plan, Including New Government-Directed Programs**

| | Administrative Budget ($M) | Incentive Budget ($M) | Demand Savings (MW) | Energy Savings (TWh) |
|---|---|---|---|---|
| Updated 2021-24 CDM Program Plan | $277 | $758 | 725 | 3.8 |
| Business and Residential | $185 | $614 | 697 | 3.6 |
| Support | $49 | $143 | 28 | 0.2 |
| Central Services | $43 | N/A | N/A | N/A |

**Note:** Values may not add up precisely due to rounding.

## 4.7 Longer-Term Opportunities

Energy efficiency makes a lasting contribution toward meeting Ontario's energy and capacity needs cost-effectively. In addition, the 2022 APS refresh has highlighted the significant quantity of achievable potential available in Ontario beyond the term of the current Framework. Consequently, the IESO believes that there are opportunities for an enduring and ongoing CDM Framework to continue providing a reliable, cost-effective and sustainable path to meet resource adequacy needs. Should the electrification and decarbonization trends explored in the P2D study materialize, continued investment in CDM will be even more important to maintain power system reliability.

New opportunities identified through the program review task will require further consideration and development. These opportunities may be pursued as part of portfolio enhancements for 2024 and beyond. Many of the identified opportunities would respond to the customer needs uncovered during the customer needs review, particularly those relating to decarbonization, an increased focus on EDI, enhancing measure offerings, building capacity and going deeper.

[11] The program administrator cost (PAC) test identifies the cost benefit of CDM from an electricity system perspective.

Given the emerging nature of many of these program enhancements, there is an opportunity for the IESO to conduct further research and potentially implement pilot projects to better understand the opportunities as well as how to best design and deliver cost-effective programs in the following areas:

- Single-family residential programs
  - Weatherization
  - HVAC tune-ups
  - Smart-home energy management
  - Support for electrification of home heating
- Income-eligible programs
  - Deeper retrofits
  - Developing a social housing–focused program
- Decarbonization-support programs
  - Efficient electrification
  - Electric vehicle support
- New-construction, net-zero and deep retrofit–support programs
- Load-management and grid-support programs
  - BTM DERs, where appropriate
  - Advanced/internet-of-things–connected controls
  - Monitoring-based commissioning

## 4.8 Jurisdictional Benchmarking

The mid-term program review included a request to benchmark the IESO's CDM portfolio against other jurisdictions.

In recent years, Ontario has fallen behind other jurisdictions in spending on energy-efficiency programs. The IESO observes that the relative success of energy-efficiency savings in other jurisdictions can be attributed to continuity in program offering and higher spending on marketing. Marketing is a proven mechanism to increase program awareness and participation. Median spending on marketing in other jurisdictions is 2.7% of budget; in contrast, the IESO allocated 0.5% of its budget to marketing as part of the current Framework.

Overall, Ontario is performing well in the commercial and industrial sectors, with notable growth potential in the residential sector. However, this analysis reinforces the need for market research, pilot programs and collaboration with Enbridge and NRCan to determine where energy-efficiency savings would be most cost-effectively achieved going forward.

Implementing the IESO's recommendations from the Next Steps and Recommendations section would position Ontario to be more aligned with high-performing jurisdictions. Details of the jurisdictional benchmarking exercise are found in Appendix 7.

# 5. Competitive Mechanisms Review

Lessons learned and recommendations from competitive mechanisms for procuring energy-efficiency resources, including results to date of the Energy Efficiency Auction Pilot, are outlined below.

## 5.1 Key Findings

Through a review of the various competitive mechanisms implemented prior to and during the 2021-2024 CDM Framework, the IESO has concluded that a robust and experienced pool of energy-efficiency service providers exists in Ontario. The IESO also concluded that a number of factors that shape the outcome of competitive mechanisms include opportunity, risk and time.

While it may be a challenge to make a direct comparison between competitive mechanisms on a purely cost-of-delivery basis due to variabilities in other factors that affect the outcome, it is important for the IESO to continue to gather lessons learned. This is particularly important where the IESO is testing a type of competitive mechanism in the Ontario market for the first time. Insights from other jurisdictions on the spectrum of outsourcing strategies, described further in Appendix 2, should also be taken into consideration as the IESO considers how a competitive mechanism can be leveraged to achieve market-driven and customer-centric solutions at a competitive cost.

## 5.2 Desired Outcomes of Competitive Mechanisms

The IESO analyzed how competitive mechanisms can affect its CDM delivery objectives, with a focus on competitive cost and customer-centric and market-driven outcomes (see Table 7).

**Table 7 | Outcomes of Competitive Mechanisms**

| Outcome | Benefits | Risks Mitigated |
|---|---|---|
| Competitive cost | Competitive mechanisms enable the IESO to deliver CDM at competitive costs while helping to maintain a cost-effective portfolio of programs. | Not pursuing competitive mechanisms could result in less competition, higher out-of-market costs and a less cost-effective portfolio of programs. |
| Customer-centric solutions | Competitive mechanisms enable the IESO to acquire solutions that are designed to meet the needs of targeted customer segments. | Not pursuing competitive mechanisms may make it more challenging for the IESO to make changes to its delivery strategy or to target new customer segments in response to market feedback. |
| Market-driven solutions | Competitive mechanisms enable the IESO to take advantage of market developments and innovation to lower costs and meet evolving system and customer needs. | Not pursuing competitive mechanisms may not be as responsive to evolving system or customer needs, which make it more challenging to meet the IESO's CDM objectives. |

## 5.3 Review Limitations

It is important to note that the results between different competitive mechanisms are not directly comparable due to differences in budget, scope of services procured, market conditions and CDM Framework length. As well, analyses for certain competitive mechanisms are limited due to the lack of data and observations available based on program maturity and/or the delivery model in-market. Therefore, a qualitative review of the competitive mechanisms was conducted based on available data to date.

## 5.4 Description and IESO Experience with Competitive Mechanisms

This section describes the competitive mechanisms that the IESO used to procure CDM and the results of the review for each competitive mechanism that was conducted, with a focus on competitive cost, customer-centric solutions and market-driven outcomes. In addition, a summary of jurisdictional research is included on the various outsourcing strategies used by program administrators and utilities in the United States. Further details are provided in Appendix 2, where the results of outsourcing different levels of program services were assessed to identify opportunities and certain outsourcing models that may be beneficial for the IESO to pursue.

### 5.4.1 Competitive Procurement of Program-Delivery Services

The IESO competitively procures service providers to provide program and delivery services, which drives down costs and encourages innovation through competition. In 2021, the IESO issued seven requests for proposal (RFPs) for program-delivery services under the 2021-2024 CDM Framework. The RFPs included scope for the following services: direct-install, project assessment and building audits, technical review, outreach, call centre and customer support, and program design. The IESO received multiple responses to these procurements with as few as four and as many as 12 unique proponents. As a result, the IESO procured several new delivery vendors under the 2021-2024 CDM Framework. Based on the range of services pursued through the RFPs and the number of proponents that responded, it can be assumed that a strong base of supplier capability for CDM services exists in Ontario.

**Limitations of Time-Bound Frameworks on Competitive Mechanisms**

It is important to note that a significant amount of effort and time are required to launch, ramp up and wind down program and vendor services within time-bound frameworks, which leaves less time to optimize the benefits and achieve the maximum possible potential of competitive mechanisms. Frequent transitions between programs and different delivery vendors resulting from time-bound frameworks impair the customer experience, as project hand-offs between different vendors result in longer times to serve participants and the need for vendors to re-engage participants and familiarize themselves with in-progress projects.

The IESO and delivery vendors will continue to work together and implement transition strategies to maintain a positive customer experience and minimize the interruption of services during program and vendor transitions. As the number of delivery vendors in the marketplace increases through the delivery models and new program opportunities that are pursued through the 2021-2024 CDM Framework, greater vendor collaboration and communication strategies will be considered and implemented. This will help ensure alignment and avoid marketplace and customer confusion, which might arise from the increased number of vendors that may engage customers for different program offerings.

### 5.4.2 Experience with Competitive Mechanisms

The competitive mechanisms that the IESO has used to procure CDM are outlined in Table 8, with associated benefits and risks detailed in Table 12. When designing and implementing a competitive mechanism, there are many factors for the IESO to take into consideration that can affect the outcome. Ultimately, as the program administrator, the IESO needs to strike a balance between risks and benefits, while reflecting on lessons learned, to develop strategies to achieve its objectives. There has been positive progress to-date in terms of realizing customer-centric and market-driven outcomes with competitive mechanisms, with additional opportunities noted to further refine current and explore additional approaches.

**Table 8 | Description of Competitive Mechanisms**

| Competitive Mechanism | Description |
|---|---|
| Centralized province-wide program delivery | • Programs delivered by a single vendor province-wide. Note that these vendors may subcontract services to various market actors (e.g., equipment suppliers or contractors).<br>• Examples include the Home Assistance Program and the Small Business Lighting Program under the Interim Framework. |
| Regional delivery of province-wide programs | • Programs delivered through a regional delivery model in which the IESO splits the province into defined regions so that vendors can focus their delivery efforts.<br>• Examples include the Retrofit Program, the Small Business Program and the Energy Affordability Program under the 2021-2024 CDM Framework. |
| Competitive procurement of local program design and delivery | • Programs focused on targeting needs within specific regions where vendors propose program design and delivery strategies to meet these needs.<br>• Examples include the LIP under the 2021-2024 CDM Framework. |

| Competitive Mechanism | Description |
|---|---|
| Competitive auction | • Procurement of CDM through an auction mechanism, where the lowest-cost resources are cleared for delivery.<br>• Examples include the EEAP, the objective of which was to test the feasibility of acquiring CDM through an auction approach and to learn whether this would yield greater cost-effective solutions than traditional approaches to acquiring CDM. |
| Competitive programs | • Programs with application windows and criteria to determine the prioritization of applications for funding.<br>• Examples include the Energy Manager Program and the Industrial Energy-Efficiency Program under the 2021-2024 CDM Framework. |

## 5.5 Competitive Mechanisms: Benefits, Risks and Mitigating Strategies

### 5.5.1 Competitive Procurement of Centralized Province-Wide Program Delivery

**Benefits:**

- Reduced administrative costs due to strong economies of scale for vendors.
- Consistent delivery approach province-wide.
- Efficient speed to market with the flexibility to quickly scale and expand program services.
- Certain programs or types of services benefit from a single province-wide vendor (e.g., procuring multiple delivery vendors to provide call centre services for the same program could increase costs and cause customer confusion).

**Risks and mitigating strategies:**

- Innovation may be limited through single-vendor delivery, as there are fewer opportunities to leverage diverse expertise and perspectives for program enhancements.
- Added risks where vendor cannot deliver or achieve objectives, as there are no alternative vendor(s) in market with established capacity to quickly transition the services.
- May reduce the IESO's ability to include incremental services and pursue program enhancements at lowest costs due to the lack of competition in the negotiation process.
- Relying on single-delivery vendors reduces marketplace capability and competition in future procurements.

### 5.5.2 Competitive Procurement of Regional Delivery of Province-Wide Programs

**Benefits:**

- Provides focused efforts on customer experience across the province, which helps to attract a more diverse group of customers, including hard-to-reach customers (rather than focusing all resources on major population centres such as the Greater Toronto Area).
- Greater opportunities to gather region-specific market feedback to inform program enhancements and better serve customers across all regions in the province.
- Ability for vendors to quickly scale up delivery services to meet evolving customer and system needs in their region; e.g., the IESO leveraged its regional delivery vendor to quickly ramp up an enhanced program offering for greenhouses in Windsor-Essex and Chatham-Kent in response to increasing capacity demand and agricultural growth in the region.
- Supports greater market competition in future procurements.
- Mitigates risks to achieving program objectives if there are issues with a vendor that affect its ability to deliver.
- Drives innovation by leveraging diverse expertise and perspective, which can improve the program offering.

**Risks and mitigating strategies:**

- May increase administrative costs by procuring duplicate services across multiple vendors and reducing economies of scale, compared with centralized province-wide program delivery.
- Risk of inconsistent delivery between multiple vendors, which may lead to poor customer experience; e.g., different vendors may enforce program requirements differently based on their interpretation, unless greater collaboration between the IESO and vendors exists to ensure alignment.
- The optimal number of delivery regions needs to be determined to optimize benefits and reduce drawbacks.

### 5.5.3 Competitive Procurement of Local Program Design and Delivery

**Benefits:**

- Partner LDCs improve the customer experience, as they can leverage their relationships and networks to increase participation and identify local needs to inform program designs and better serve local areas.
- Serving areas with local needs results in cost benefits by deferring the need to secure additional capacity and build new transmission and distribution systems that are costlier, have lengthy construction times and may be challenging to build in densely populated areas.

**Risks and mitigating strategies:**

- Design options proposed by the marketplace to date have been limited, as proposed designs cannot duplicate existing province-wide program offers.

- Greater marketplace investments may be required to propose non-duplicate offerings that can meet the needs of local target areas, given that the IESO offers a broad range of programs.
- There may be cost advantages to meeting local system needs through other mechanisms, such as leveraging program infrastructure through existing programs and providing incentive adders.

### 5.5.4 Competitive Auction

**Benefits:**

- Resources can be cost-effective, as they are based on cleared prices.
- Cleared resources may also be competitive and cost-effective compared with other mechanisms used by the IESO to procure capacity resources when considering persisting savings and a 10-year expected effective useful life for the cleared resources.
- The EEAP allowed a wide range of market actors to participate, which builds marketplace expertise and helps to enable different types of customers and facilities to participate.

**Risks and mitigating strategies:**

- Although auctions may allow for greater flexibility with participation, the offering may compete with existing province-wide programs for resources.
- The market may see greater risks with participating in an auction, and therefore the reward needs to be significant enough to offset these risks to attract more innovative resources and draw participation from resources that would otherwise pursue a province-wide program.

### 5.5.5 Competitive Programs

**Benefits:**

- Program participants are driven to reduce costs through a competitive application process.
- Allows for a wide range of market actors to participate, which builds marketplace expertise and supports long-term capability for future CDM opportunities.
- Enables flexible and innovative projects based on customer needs, which can provide greater opportunities for customers to participate.

**Risks and mitigating strategies:**

- Customers with fewer in-house capabilities or with less access to market expertise may not be able to build competitive applications and may be better suited to participate in programs with more program-support services.

## 5.6 Energy Efficiency Auction Pilot Results

In March 2021, the IESO ran an EEAP to procure winter and summer peak demand savings starting in winter 2022 and summer 2023, respectively. The purpose of the pilot was to inform discussions around using competitive auctions to acquire CDM to meet system needs, with specific learning objectives including assessing the interest and ability of different parties (e.g., LDCs, large customers, energy services companies, etc.) to compete to deliver CDM through an auction mechanism, establishing costs for auction-acquired CDM and understanding timeline requirements and deliverability issues.

The EEAP awarded nearly the full $5 million budget to acquire commitments to deliver 7.4 MW of winter peak demand savings and 6.6 MW of summer peak demand savings. In total, nine participants, all either large customers or energy services companies, cleared 17 energy-efficiency resources representing CDM projects in the commercial, institutional and industrial sectors. The weighted average of the cleared EEAP offer prices was $334/kW for the winter commitment period and $378/kW for summer, which is below the historical Retrofit Program's custom measure incentive rates of $400-$800/kW. However, as the pilot has approached the November 1, 2022, to February 28, 2023, period to deliver winter demand reductions, participants have relinquished the majority of winter commitments. The IESO will continue to monitor energy-efficiency resource delivery, particularly approaching the June 1, 2023 to August 21, 2023 summer commitment period, and will then conduct a formal pilot evaluation. The IESO cautions against drawing broad conclusions until the completion of the pilot and subsequent evaluation. Additional detailed results to date from the pilot, including stated reasons for relinquishing winter commitments, are outlined in Appendix 8.

## 5.7 Jurisdictional Benchmarking

The IESO reviewed the Taxonomy of Utility Outsourcing Models report, which was published by DNV (formerly DNV-GL) on March 5, 2017, as part of its analysis of the various approaches to competitive mechanisms. The models described within the report range from minimal outsourcing to arm's-length resource acquisition (further details are included in Appendix 2).

The IESO currently uses more than one outsourcing model through its overall CDM delivery strategy. For programs with relatively low application volumes and higher incentive values, such as the IEEP, the IESO uses activity outsourcing for technical review services while managing participant recruitment and contracting with its own resources. For well-established, high-volume programs such as Retrofit Program, the Small Business Program and the EAP, the IESO utilizes the integrated program outsourcing model. In these circumstances, the responsibility for the entire participant journey through the program is outsourced, while the IESO monitors key performance indicators, provides province-wide marketing support and maintains the authority to implement program design changes.

While the benefits of greater outsourcing can include greater market-driven solutions and reduced costs, certain factors vary across different jurisdictions and affect the level of outsourcing that is pursued to achieve CDM objectives. These factors include the budgets, resources, policy requirements and oversight required by each administrator or utility. The report also indicates that while there is a greater reliance on certain outsourcing models, none of the utilities assessed rely on only one outsourcing model to achieve their CDM objectives. The IESO recognizes the various outsourcing models and will consider which models are best suited to achieve its objectives on an ongoing basis.

# 6. Local Distribution Company Collaboration Opportunities

## 6.1 Background

During the 2021-2024 CDM Framework Mid-Term Review stakeholder engagement, the IESO heard from some LDCs and representing associations that LDCs would like to further participate in the delivery of CDM; this included feedback from the Electricity Distributors Association, the Ontario Energy Association, Toronto Hydro, Hydro One Networks and Hydro Ottawa. The Minister also acknowledged the opportunity for LDCs to participate in local CDM: in the October 4, 2022, Directive to the IESO and the October 4, 2022 Letter of Direction to the OEB, the Minister noted the opportunity for the IESO to support distributors' CDM applications to the OEB for rate-funding and requested that the OEB work with the IESO to reduce barriers, respectively.

The IESO has been working collaboratively with LDCs since 2007 to deliver CDM in the province. During that time, various agreements and delivery models have been used to structure this collaboration, as directed to the IESO by the government. When considering the issues below, which are observations from past experience, it is important to note that LDCs are not a homogenous group of utilities in terms of both their capabilities and their interest in delivering CDM:

- Decentralized LDC responsibility for program delivery through previous frameworks resulted in high variability in savings achievements across LDCs. This was accompanied by inconsistent participant experiences within the same program, as demonstrated through feedback received from customers and channel partners. For example, contractors frequently indicated that measurement and verification plans accepted by one LDC were questioned by another LDC for the same project installed at a different location, which also impacted the customer experience.
- Decentralized LDC responsibility for program delivery also resulted in cost inefficiencies due to the duplication of delivery infrastructure and the fact that economies of scale were not realized in the procurement of service providers, as well as the enhanced oversight and due diligence required by the IESO when transferring funds to more than 70 different entities. Through the Interim Framework and the delivery of streamlined energy-efficiency programs, the IESO was able to reduce costs by $442 million from the previous Conservation First Framework while achieving the same savings target.

- Funds offered in the Conservation First Framework to encourage LDC innovation, deliver local solutions and encourage regional collaboration were all undersubscribed by LDCs. At the request of LDCs to continue to meet local needs, a Local Initiatives Fund was established in the Interim Framework. The Fund was also undersubscribed, with only $18 million of the $29 million budget committed to programs, and only $12 million ultimately spent (20 LDCs participated in 12 programs). As well, when LDCs were offered the opportunity to access funds to assist with marketing the centrally delivered Home Assistance Program[12] to their customers, fewer than 20 LDCs took advantage of this offer.

It is important to understand the approaches taken to date, the opportunities and challenges that resulted and the current landscape in order to determine a principles-based approach for LDC participation.

## 6.2 Collaboration Opportunities

The IESO recognizes the valuable relationships that LDCs have with their customers and their key role in supporting local electricity needs. The IESO also recognizes and appreciates the local insights and relationships that LDCs have brought to CDM program planning and delivery through many years of collaboration with the IESO. Given the evolving system needs both provincially and locally, the IESO acknowledges the role that LDCs can play in further fostering CDM to address these needs, specifically local distribution needs. The IESO is committed to working with LDCs across the province to explore how CDM can provide further value to Ontarians. Establishing criteria that balances risk and value will set the stage for increased collaboration between the IESO and LDCs in CDM.

## 6.3 Access to Tools and Data

The OEB's Conservation and Demand Management Guidelines for Electricity Distributors are the primary mechanism for compensation for LDC CDM activities, as they set out the criteria for LDCs to use CDM to meet distribution-level needs and to seek to recover their costs through the distribution rate application process. It is our understanding that the OEB has seen limited use of the Guidelines by LDCs to implement local CDM programming. Through our conversations to date, some LDCs have expressed uncertainties with respect to submitting applications to the OEB under these Guidelines, specifically about how to demonstrate evidence of need, the cost-benefit analysis requirements and how to determine appropriate cost allocation for the implementation of the solution.

[12] The Home Assistance Program has since been replaced with the Energy Affordability Program.

The IESO can support LDCs with tools and information to address these uncertainties as they consider local CDM (where need is based solely on the distribution system and determined through local planning processes) and regional CDM (where the need is demonstrated through the integrated regional planning process, which can be cited as evidence of need). Currently, the IESO provides bulk system avoided cost tables in the APO to support the calculation of benefit-cost analysis. Further, the IESO can provide data to LDCs about regional or local CDM opportunities by providing access to the APS and DER Potential Study to help LDCs identify quantifiable opportunities for CDM that would address local or regional needs. It should also be noted that in early 2023, the IESO plans to publish guidelines for the evaluation of non-wires alternatives; this document could be helpful to LDCs as they look to support applications to the OEB by proposing a consistent methodology for the assessment of opportunities. The IESO is open to exploring further opportunities to broaden the data or analysis available to LDCs to support their applications.

## 6.4 Next Steps

When considering future opportunities to leverage LDC knowledge and expertise to strengthen the effectiveness of provincial and local programs under the current 2021-2024 CDM Framework, a principled approach that considers maintaining cost effectiveness, minimizing risk and enhancing customer experience, among other factors, is key. The IESO is committed to exploring opportunities to work together; to that end, it will be conducting outreach with LDCs and representative associations throughout the remainder of 2022 and into 2023 to discuss opportunities to enable LDC participation in the current Framework and to better understand the challenges LDCs are noting with respect to regulatory processes and how the IESO may be able to support them.

# 7. Next Steps and Recommendations

Upon completion of the Mid-Term Review, it was noted that the 2021-2024 CDM Framework forecast is close to fully achieving its energy and demand savings targets, with work continuing to close gaps in the remaining two years. The October 4, 2022, Directive to expand and enhance programs under the Framework underlines the value of CDM as a reliable, cost-effective, non-emitting resource that can respond quickly to emerging system needs. The Directive's increased Framework targets and budgets will contribute to meeting mid-decade capacity needs; the APS refresh has highlighted the significant opportunity for additional CDM post-2024 to do even more to meet system needs. The broader social and economic context has changed considerably since the Framework was originally established, including an increased focus on decarbonization; the Mid-Term Review has highlighted that there is additional opportunity for CDM to play an even larger role after 2024 to contribute to system and customer needs.

Of particular note, customers are asking for greater flexibility to pursue more specialized energy-efficiency projects. As well, as decarbonization becomes a priority, customers are seeking support for projects to electrify end uses and install customer-sited BTM DERs. This trend presents both challenges and opportunities (with appropriate programming) for the grid.

Ontario is well positioned to seize these opportunities to expand the scale and nature of CDM to address changing system and customer needs. The October 4, 2022, Directive represents more than a decade of continuous investment in CDM programming that has resulted in strong Save on Energy brand trust, expertise in program administration and robust evaluation and compliance processes to ensure ratepayer value. Under the current Framework, the IESO has gained valuable experience with the greater use of competitive mechanisms to yield diverse benefits.

This section outlines next steps and recommendations for the remainder of the 2021-2024 CDM Framework. Recognizing the rapidly evolving electricity system in light of decarbonization efforts and as discussed in the P2D study, it also outlines recommendations for CDM after the current Framework, including actions that should be undertaken in 2023-2024 to support the success of post-2024 programs and enhance the contribution of CDM in meeting both system and customer needs.

## 7.1 Next Steps for 2021-2024 CDM Framework Success (Existing IESO Authority)

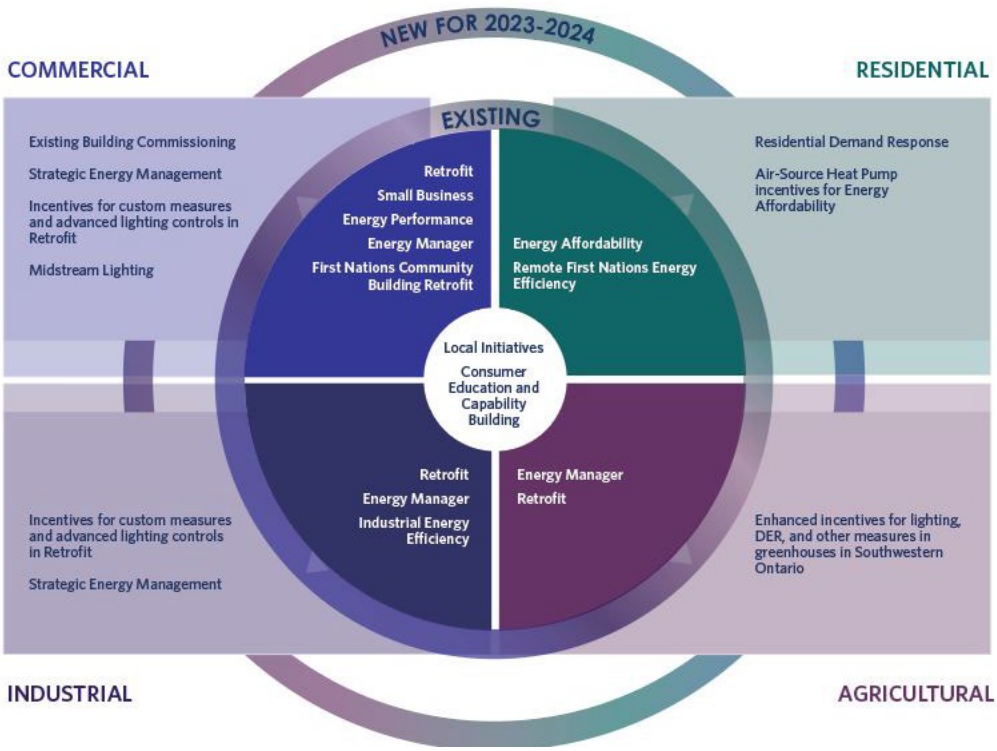
The IESO will continue to take a number of actions under its existing authority:

- Continue to implement the 2021-2024 Framework Program Plan, including programming for income-eligible and on-reserve First Nations communities, according to budgets, targets and schedules, while implementing program-enhancement opportunities identified as part of the individual program reviews (see Appendices 5 and 6). Enhancements are summarized in Table 12 below and will include:

    - Launching new Existing Building Commissioning, Strategic Energy Management, Custom Lighting and Midstream Lighting programs (either as standalone programs or as enhancements to the Retrofit Program). In combination with the four new/enhanced AAR report-back programs, the expanded suite of programs will address identified opportunities for HVAC in the residential sector; better supporting advanced- and connected-control systems and other non-lighting savings in the commercial and institutional sector; and targeted support for greenhouse lighting, controls and BTM DER projects in the agricultural sector.
    - Introducing regional incentive adders, as warranted, to target savings where they can provide additional value to meeting both regional needs and provincial system needs.
- Increase marketing and outreach to support the AAR report-back programs and energy-support programs.
- Continue to monitor and adjust as needed the support programs (e.g., income-eligible and First Nations) to ensure that they are achieving policy objectives, including:
    - **EAP:** Re-allocating any unspent budget toward the inclusion of air-source heat pumps in the program as well as additional marketing support to drive greater participation in the program, with consideration of specific circumstances for First Nations communities. The IESO will also continue to engage with the EAP Roundtable, program delivery partners and CECs to ensure there is awareness of programs for on-reserve community members and implement enhancements to address language and digital barriers.
    - **First Nations Programs:** Monitor the uptake of the recently launched First Nations programs (RFNEEP and FNCBRP), and adjust delivery as needed to meet participation targets and result in meaningful impact for communities. This will include exploring collaboration opportunities with Enbridge to coordinate outreach and delivery for the FNCBRP with First Nations communities that are Enbridge customers.
- Undertake new achievable potential studies, as warranted by significant changes to forecasted needs, CDM technologies and costs, to effectively inform program design, assessment of regional/local non-wires potential and future framework target and budget setting. Should the province transition to a longer-term, more flexible approach for setting CDM targets and budgets, the timing of potential studies should be coordinated to inform broader resource planning and acquisition activities.
- Continue to assess and adapt competitive mechanisms, including outsourcing varying degrees of program services, to maximize cost and non-cost benefits informed by market feedback, stakeholder input, annual program evaluations and learnings from other jurisdictions. This includes continuing to collect learnings from the EEAP, the LIP and the Industrial Energy-Efficiency Program, and identifying continuous improvement opportunities for program-delivery vendor procurements, such as optimizing the length of contract term and the number of delivery regions to balance cost, delivery risk mitigation and competition considerations.
- Continue to pursue program-delivery collaboration opportunities with Enbridge and NRCan to help program participants achieve deeper savings and reduce IESO administrative costs.

- Continue to engage with LDCs on opportunities to build on IESO CDM programs to provide local system benefits, leveraging the OEB CDM Guidelines for Electricity Distributors.[13]

**Figure 12 | Summary of Existing and Planned CDM Programs and Offerings**




## 7.2 Recommendations for Post-2024 Success (May Require New Authority)

The IESO recommends that government support and enable the IESO to proceed with a number of actions to further foster CDM on a more enduring basis, recognizing the role of CDM as a non-emitting resource to support system needs:

- Adopt an enduring approach for post-2024 that moves away from time-bound frameworks and better leverages CDM as a resource to respond to evolving system, market and customer needs. This should include considerations for the potential interaction with the IESO's broader resource planning and acquisition activities while continuing to facilitate appropriate reporting and oversight. Such an approach would support achieving the level of CDM contemplated in the P2D report, while maintaining policy option flexibility.
- Establish post-2024 CDM targets and budgets that reflect currently forecasted system needs and achievable potential, as well as EDI to ensure equitable program access and a diverse workforce.

[13] Under the OEB's Conservation and Demand Management Guidelines for Electricity Distributors (EB-2021-0106), LDCs may seek rate-funding to implement additional CDM activities to address specific planning needs.

- Reallocate a portion of available Central Services budget toward research to support the development of post-2024 CDM programs meeting evolving system and customer needs – particularly programs addressing sectors identified as high potential in the APS refresh and customer decarbonization trends. This might include research related to the following:
    - Acquiring additional savings and better meeting the needs of the residential sector and the multi-family and social-housing segments.
    - How CDM programs should evolve to support customers' policy- and market-driven electrification projects to best manage grid impacts (i.e., efficient electrification).
    - Opportunities for residential and commercial electric vehicle programs that complement the ultra-low overnight electricity rate to manage the impact of transportation electrification on the provincial and local electricity systems.

# Appendix 1: Review of Regional Needs

## Methodology

The exercise of identifying regional electricity system needs that could be targeted with conservation demand management (CDM) began with an inventory review of all needs identified in the regional planning process (i.e., areas where electricity demand is forecasted to surpass the rated capacity of transmission and distribution system assets). To assess the opportunity for CDM to address these needs, the IESO used the following criteria, which were developed for the first round of the Local Initiatives Program (LIP):

- **Timing of need:** Targeting CDM at areas with medium-term needs (e.g., 5-10 years), which allows for the possibility of wires deferral; some immediate needs can also benefit from CDM to help address reliability issues.
- **Size of need versus load:** Targeting needs that are less than 2 per cent of customer demand ensures that there is sufficient customer load that can be targeted to deliver CDM savings.
- **Coincidence with provincial system peak:** Targeting regional and local needs that occur during the provincial system's summer peak demand period primarily drives capacity needs and maximizes the value of the targeted CDM to the provincial system and, by extension, provincial ratepayers.
- **Community support and siting:** Prioritizing areas with strong support from municipalities for CDM ensures community support for local programs; as well, LDC backing is needed to define the procurement target area and provide customer data to target programs.

# Appendix 2: Competitive Mechanism Jurisdictional Research

The competitive mechanisms review includes jurisdictional research on the approaches to outsourcing different levels of program services to achieve conservation and demand management (CDM) targets and objectives by utilities and program administrators in the United States. Data was taken from the Taxonomy of Utility Outsourcing Models report, which was published by DNV (formerly DNV-GL) on March 5, 2017, as well as interviews conducted in 2019 with program administrators in California, Illinois and Wisconsin.

Utilities and program administrators in the United States were assessed by DNV in a study for the Pacific Gas & Electric Company (PG&E) to understand the different types of outsourcing models that various jurisdictions use as competitive mechanisms to procure CDM. The study was developed in response to the California Public Utilities Commission requiring PG&E and other investor-owned utilities in California to outsource at least 60 per cent of the design and implementation of their CDM portfolio to third parties by the end of 2022.

DNV-GL developed a taxonomy to classify different outsourcing models and distinguished the typical responsibilities for utilities and third-party implementers for each model based on case studies and the outsourcing practices of utilities that were assessed. The different types of outsourcing determined by DNV-GL through its assessment of the outsourcing practices of 25 utilities, excluding California investor-owned utilities, are categorized under five outsourcing models (see Table A2.1). The level of outsourcing was lowest for minimal outsourcing and highest for arm's-length resource acquisition. These outsourcing models were examined by the IESO to inform its approaches to competitively procure CDM.

**Table A2.1 | Outsourcing Models**

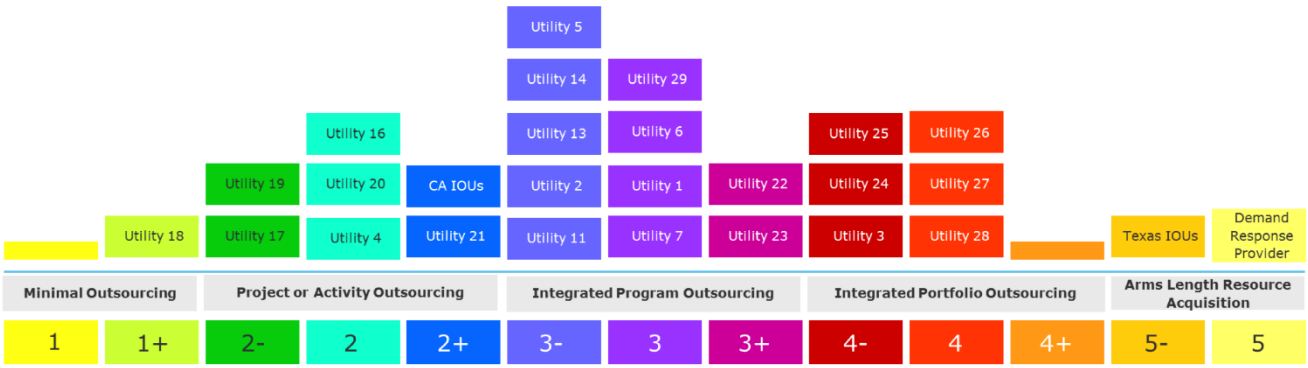
| Model | Description |
|---|---|
| Minimal outsourcing | The model used by utilities to perform most functions and responsibilities when procuring CDM through insourcing. Where outsourcing of program services is conducted, when necessary, it is only typically done to temporarily manage peak workload periods or secure case-specific external expertise to meet regulatory requirements and laws. The utility retains control and oversight over all aspects of the services that are outsourced through this model, as well as the branding design and delivery of their programs, among other services. |

| Model | Description |
|---|---|
| Project or activity outsourcing | The model used by utilities to outsource specific program projects or activities. The length of the contracted services is often limited to the duration of the project and pursued to augment existing utility capabilities. Examples include outsourcing technical-review and engineering services for program applications and field inspections. The utility often assumes the role of project manager and leverages specific expertise from the contractor as part of its program delivery strategy. |
| Integrated program outsourcing | The model used by utilities to outsource most program functions and activities under a single contract. The utility assumes the role of program manager, overseeing the management of all program functions and services by the contractor. The contractor is responsible for implementing program services, while the utility retains control and final approval authority of a program's design, with a more collaborative role from the contractor that proposes a program design based on the utility's requirements. The utility also retains control over program branding and the integration of contracted services with core utility functions, and discretion around the types of customers targeted and process through which they are engaged. |
| Integrated portfolio outsourcing | The model used by utilities to outsource a portfolio of programs or a single large program that is managed by a single contractor that employs substantial subcontractors. The contractor is responsible for implementing and integrating portfolio services between programs and proposing the program design and portfolio composition based on the utility's requirements, while the utility retains approval authority over the design and composition. The utility is responsible for managing the portfolio, integrating contracted services with core utility functions and retaining control of program branding and the types of customers targeted and the process through which they are engaged. |
| Arm's-length resource acquisition | The model used by utilities to outsource most program services to a contractor with minimal or no involvement in the program's design or delivery. The utility assumes the role of contract manager and is responsible for ensuring that the contractor is compliant with their contract, oversees the achievement of contract milestones and often has limited brand representation associated with the program and involvement in customer management. |

Other jurisdictions use different outsourcing models as competitive mechanisms to achieve their CDM targets and objectives. Based on the objectives, budget, resources, policy requirements and oversight required by each utility, there are benefits and opportunities to reduce costs and support customer experience, innovation and flexibility.

Figure A2.1 is taken from the DNV-GL report. It illustrates the primary outsourcing model used by utilities assessed by DNV-GL, where the level of program services outsourced increase from 1 to 5. The plus sign (+) denotes utilities moving toward a higher outsourcing level, and the minus sign (-) denotes utilities moving toward a lower outsourcing level. While utilities may use a certain outsourcing model more frequently than others, none of the utilities assessed in DNV-GL's report rely on one outsourcing model; instead, they use different outsourcing models to achieve CDM objectives.

**Figure A2.1 | Spectrum of Utility Outsourcing Models**




The utilities assessed by DNV-GL demonstrate attributes that align with a range of outsourcing models, with a large proportion of utilities pursuing integrated program outsourcing. Relative to other jurisdictional utilities, the IESO mainly uses the project or activity outsourcing model and is moving toward using the integrated program outsourcing model by exploring the benefits of outsourcing program-design services to the marketplace through the LIP.

As part of the jurisdictional research, the IESO also interviewed jurisdictions in California, Illinois and Wisconsin in 2019 that outsource a higher degree of their services to understand the scope of services procured and results. A summary of the findings and results from the interviews is detailed below.

**Table A2.2 | Outsourcing Models and Results from IESO-interviewed Jurisdictions**

| Jurisdiction | California | Illinois | Wisconsin |
|---|---|---|---|
| Outsourcing Model | Integrated Program Outsourcing (Open) | Integrated Program Outsourcing (Prescribed) | Integrated Portfolio Outsourcing |
| Approach | As of 2006, investor-owned utilities (IOUs) were mandated to competitively procure a percentage of their Energy Efficiency (EE) budget.<br>• By 2022, 60% of EE budget to be outsourced<br><br>Different IOUs lead different procurements for statewide programs/services.<br>• $1 billion annual budget | Utilities required to use third-party procurement (requests for proposal [RFPs]) to deliver energy-efficiency programs.<br>• Utilities with more than 3 million customers: $25 million must be spent on third-party EE programs annually<br><br>500,000 to 3 million customers: $8.35 million annually.<br><br>Cut energy use by 21.5 per cent and 16 per cent (ComEd and Ameren, respectively) by 2030, from 2014 baseline. | Utilities collectively establish and fund a statewide EE and renewable resource program called Focus on Energy.<br><br>IOUs formed a non-profit organization called the Statewide Energy Efficiency and Renewable Administration (SEERA).<br><br>2005 Wisconsin Act 141 requires SEERA to contract, on the basis of competitive bids, with one or more firms to develop and administer programs.<br>• Program administrator responsible for competitively procuring service providers |
| How long has EE been procured | Since 2006, a portion of EE has been mandated for procurement | Since 2008, a portion of EE has been mandated for procurement | Since 2005 |
| Service procured | Design, delivery, evaluation<br><br>Utilities retain authority to advise on design elements | Design, delivery, evaluation<br><br>Utilities retain right to advise on elements of design | Administration, program design, delivery, evaluation<br><br>Public Commission and SEERA retain authority to advise on design elements |

| Jurisdiction | California | Illinois | Wisconsin |
|---|---|---|---|
| Segments and/or targeted needs | Main customer segments: agricultural, industrial, commercial, public, residential<br><br>Proposals must align with one or multiple program functions: energy-savings acquisition, hard-to-reach customers and disadvantaged communities, market transformation, grid resource | Legislation outlines that utilities must specify the technologies, customer segments, and geographies targeted by the RFP | Residential, business, agricultural |
| Portion of budget procured | See above | See above | ~100 per cent (individual utilities may elect to deliver additional programs) |
| Offer requirements | Two stages: request for application (RFA) and RFP<br>• Must target one of five main segments, and serve at least one program function (see above)<br>• IOUs must use independent evaluators as well as EE procurement review group | Open-source programs must meet the following requirements:<br>• Program delivers EE savings, incremental to core portfolio, does not duplicate<br>• Program uses proven implementation approaches and technologies<br>• Ineligible programs: renewable energy generation, demand response, voltage optimization and power factor correction | Separate RFPs for program administrator and program evaluators<br><br>Program administrator responsible for procuring all necessary resources for implementation, also with competitive procurements approved by SEERA |

| Jurisdiction | California | Illinois | Wisconsin |
|---|---|---|---|
| Drivers | Generate energy savings in areas that IOUs have not previously served, or have struggled to serve cost-effectively<br><br>Test innovative technologies or unique approaches to program delivery<br><br>Reduced customer responsibility<br><br>Reduction of portfolio admin costs by 10 per cent by 2020 (PG&E) | Expand upon core programs by developing an enhanced portfolio that meet the needs of underserved customers, markets and segments while also engaging experienced implementation contractors with proven track records in administering similar programs | Enhance economic development and make Wisconsin firms more competitive<br><br>Expand the ability of markets to deliver energy-efficient and renewable energy goods and services to consumers and businesses<br><br>Deliver financial returns on public investments in energy improvements |
| Results | Evaluations from 2013-2014 showed that programs are cost-effective despite targeting harder-to-reach segments and featuring more comprehensive services<br><br>Much smaller contribution to statewide EE, but goal was not to compete with core programs, but rather to serve specific needs<br><br>No direct comparisons of cost-effectiveness/efficiency against programs delivered by utilities | Healthy market response to RFPs with large number of bids received; however; a not insignificant number of proposed programs did not meet minimum RFP requirements | 2015-2018 targets achieved and impressive cost-effectiveness results (Total Resource Cost test = 3.62) |

# Appendix 3: Summary of Activities Undertaken to Inform Customer Needs Review

## Methodology

To ensure that a broad range of perspectives was taken into consideration, the IESO engaged with customers, communities, stakeholders, program-delivery partners and associations through direct outreach as well as formal engagement activities. In addition to gathering this direct feedback, the IESO undertook primary market research activities to further understand customer needs and experiences. Customer satisfaction surveys from certain programs were also leveraged to inform findings. These findings were then anchored against a jurisdictional scan to understand how observations from Ontario align with other jurisdictions.

The table below summarizes the different customer needs activities undertaken, each which was tailored to specific audiences across all customer segments.

**Table A3.1 | Customer Needs Review Activities**

| Activity | Methodology | Timeline |
|---|---|---|
| Monthly customer satisfaction surveys | Conducted by Ipsos to gain insight into the following Save on Energy programs: Retrofit, Small Business and Energy Affordability. | January 2021 to present |
| 2022 Save on Energy brand equity survey | Conducted by Ipsos, leveraging survey data for residential consumers weighted by gender, age and region to reflect the adult population of Ontario. | May to June 2022 |
| Income-eligible household market research survey | Conducted by Ipsos, survey targeting income-eligible households in Ontario. | Q4 2021 to Q1 2022 |
| Energy Affordability Program Roundtable | Quarterly meeting to gather insights from organizations that support the income-eligible sector. | Q1 and Q2 2022 |
| Consumer preferences survey | Conducted by Ipsos to identify what is most important to consumers about electricity services. | August to September 2020 |

| Activity | Methodology | Timeline |
|---|---|---|
| First Nations and Métis engagement | Leveraged stakeholder engagement findings from Indigenous Conservation Programming: A New Approach, Report on Energy Conservation for First Nations and Métis in Ontario. | March 2018 |
| | First Nations representatives participated in the stakeholder and community engagement that informed the design of the First Nations Community Building Retrofit Program. | 2021 |
| | Continuous feedback was also provided through Indigenous members of the Energy Affordability Program Roundtable as well as quarterly meetings with IESO Community Energy Champions. | Q1 to Q4 2022 |
| Jurisdictional scan | The following studies were leveraged:<br>• American Council for an Energy-Efficient Economy, State Energy-Efficiency Scorecard: 2021 Progress Report<br>• American Council for an Energy-Efficient Economy, The New Leaders of the Pack: ACEEE's Fourth National Review of Exemplary Energy-Efficiency Programs<br>• Efficiency Canada, 2021 Canadian Provincial Energy-Efficiency Scorecard<br>• International Energy Agency, Energy Efficiency 2021 Report<br>• California Energy Commission, 2019 California Energy Efficiency Action Plan | Q2 2022 |

| Activity | Methodology | Timeline |
|---|---|---|
| Direct marketplace outreach | 100+ direct conversations with those who participate in, or support participation in, Save on Energy programs. A prioritization exercise was undertaken that identified organizations from priority sectors: industrial, commercial, institutional, municipal, income-eligible and Indigenous community members, LDCs and program-delivery partners to ensure broad coverage. | Q2/Q3 2022 |
| IESO stakeholder engagement days | 150+ participants in April 22 and July 19 stakeholder-engagement sessions. | April and July 2022 |

# Appendix 4: Annual Acquisition Report Report-Back Programs

The Minister of Energy's letter from April 4, 2022, asked the Independent Electricity System Operator (IESO) to report back with options and analysis for cost-effective additional/expanded conservation and demand management (CDM) programming to address the following issues arising from the 2022 Annual Acquisition Report (AAR):

- Growing province-wide capacity needs starting in 2025 and increasing energy needs in the late 2020s
- Emerging regional needs and opportunities for other cost-effective non-wires alternatives
- Expansion of agricultural greenhouses and heightened electricity needs in Southwestern Ontario

In response to the request to identify near-term enhancements to the 2021-2024 CDM Framework, the IESO recommended four additional CDM program opportunities to help address the emerging 2025-2026 system needs. In October 2022, the IESO received a Directive to implement these recommendations in totality, expanding the current CDM Framework. This additional funding of $342 million will enable programming to deliver additional peak electricity demand savings of 285 megawatts (MW) and additional annual energy savings of 1.1 terawatt-hours (TWh) by 2025.

In order to identify the strongest opportunities for incremental CDM, the IESO evaluated a variety of options against the following considerations:

- Has appropriate speed to market
- Meets emerging province-wide system needs
- Meets emerging regional system needs
- Is cost-effective
- Is highly feasible/a proven approach
- Is consistent with long-term objectives
- Meets electrification/decarbonization objectives
- Targets savings with longer effective useful life to address energy needs emerging later in the decade as well as customer needs and program cost-effectiveness

## Summary of Opportunities

The IESO identified four immediately implementable CDM opportunities (see Table A4.1) that could contribute, as part of a package of resource procurements, to meeting needs emerging mid-decade (approximately 1,130 MW in 2025 and 2,380 MW in 2026) and ensuring system reliability within six to nine months of approval:

1. Residential Demand Response Program
2. Retrofit Program incentives for custom measures
3. Enhanced Local Initiatives Program (LIP)
4. Targeted Greenhouse Program

The total portfolio of enhancements will cost $342 million through 2024 and result in a peak demand reduction of 285 MW and annual energy savings of 1.1 TWh by 2025. This includes 70 MW of incremental peak demand savings in the Retrofit Program resulting from budget being redirected. These opportunities will also contribute to system affordability, providing a total net system benefit of $312 million in support of attracting economic investment, decarbonization of the broader economy and energy-cost management for Ontario consumers and businesses.

**Table A4.1 | AAR Report-Back Programs Summary**

| Opportunity | Description |
|---|---|
| Residential Demand Response Program | • Province-wide demand response program targeting residential customers with central air conditioning and installed smart thermostats.<br>• Bring Your Own Device: Households with installed thermostats are paid an annual incentive in return for allowing the IESO to reduce their cooling load on a select number of summer afternoons in order to reduce peak demand. |
| Retrofit Program incentives for custom measures | • Fixed incentive rate for savings from custom energy-efficiency projects available to business customers across Ontario; offered as a $/kW or $/kWh rate. |
| Enhanced LIP | • Proposed enhancements to existing LIPs, such as regional incentive adders to province-wide programs and flexibility for including incentives for behind-the-meter distributed energy resource (BTM DER) solutions, such as generation and storage, as well as increased budget over the remainder of the framework. |
| Targeted Greenhouse Program | • Specialized opportunity in Southwestern Ontario for greenhouse growers to install light-emitting diode (LED) lighting and controls for greenhouse energy systems, with an option to include incentives for BTM DERs, such as combination solar generation and battery storage. |

## Detailed Description of the AAR Options

The following sections provide a greater level of detail about the anticipated benefits and program design consideration for the four near-term opportunities.

## Residential Demand Response Program

The IESO proposed a province-wide demand response program targeting residential customers with central air conditioning and smart thermostats. It will be implemented as a Bring Your Own Device Program, starting with smart thermostats and potentially expanding over time to include device rebates and other controllable devices (e.g., electric vehicle charging and water heaters). Households with installed smart thermostats would be paid an annual incentive in return for allowing the IESO to reduce their cooling load on a select number of summer afternoons. The IESO will manage a competitive procurement of a distributed energy resource management system (DERMS) provider to deliver the program, including outreach, enrollment and event dispatch.

### Program Design Considerations and Benefits

The IESO DER Potential Study identified residential demand response as one of the largest DER opportunities in Ontario: residential heating, ventilation and air conditioning (HVAC) demand response opportunities are expected to grow significantly over time to offer the largest single contribution to summer capacity by 2032, enabled through the increased prevalence of smart thermostats in Ontario. Stakeholder discussions with thermostat manufacturers and DERMS providers suggest that more than 600,000 smart thermostats are currently installed in Ontario.

The residential sector has historically had little participation in the Capacity Auction, and thus afternoon air-conditioning load presents a considerable new opportunity for reducing the 2025 summer peak. The IESO is designing the offer based on learnings from the York Region Non-Wires Alternative pilot project, the IESO's Capacity Auction, the former Peaksaver Program and the IESO-funded local distribution company (LDC) local demand response pilot projects (funded through the former LDC Innovation Fund) as well as feedback on successful programs in other jurisdictions.

There is significant potential to further expand the Residential Demand Response Program over time for greater eligibility/uptake, market reach and flexible response, including the possibility to leverage the program for zonal transmission constraints. Province-wide program and technological solutions can also be designed and procured to accommodate LDC demand response program opt-ins, with interested LDCs that identify local distribution needs seeking Ontario Energy Board funding to provide additional incentives to participants. This may also offer a test case for LDC opt-in to more broadly support province-wide programs.

## Retrofit Program Incentives for Custom Measures

The IESO will offer a fixed incentive rate (as a $/kW or $/kWh rate) for savings from custom energy-efficiency projects available to business customers across Ontario.

Examples of non-lighting projects that the incentive may target include large compressed-air upgrade projects, large variable-frequency drive replacements, chiller and other HVAC replacement and/or optimization projects, building-automation systems, building-envelope upgrades and higher-efficiency new construction, deep retrofit and net-zero opportunities. Targeted customer segments will comprise the broadest range of industrial, commercial and institutional customers, each of which is critical to deploying energy efficiency and stimulating economic growth.

The incentives for custom measures will be administered by existing retrofit service providers, with incremental activity (e.g., uptake, budget and savings) tracked separately. In this way, the program enhancement will benefit from existing outreach and relationships already developed, as well as cost-efficiencies introduced by shared infrastructure.

**Program Design Considerations and Benefits**

Market feedback suggests a desire for incentives for projects that do not easily fit into existing prescriptive equipment categories. The Retrofit Program's Custom Track was eliminated in 2021 to align with reduced system need at that time and to prioritize budget management, and can be reinstated to deliver a significant contribution to emerging grid needs. Smaller industrial projects that do not meet the eligibility criteria for the Industrial Energy-Efficiency Program will also benefit in the absence of the former Process and Systems Upgrade Program.

Retrofit Program incentives for custom measures will encourage cost-effective energy and demand savings with longer average measure life, thereby contributing to longer-term energy needs. The average effective useful life of retrofit project savings is approximately 10 years.

## Enhanced Local Initiatives Program

The system needs review identified significant opportunities that could be addressed by targeted CDM. Based on the programs review task outcomes, the IESO has noted that the LIP could be enhanced to better serve regional needs with proposed improvements and budget expansion by:

1. Allowing regional incentive adders to province-wide programs so that LIP offerings can leverage provincial program-delivery infrastructure, making them faster to implement and more cost effective.
2. Including incentives for BTM DER solutions and exploring the possibility of broadening LIP effectiveness while also supporting emerging customer preferences. An internal review of IESO-supported non-wires alternative projects, Southwestern Ontario greenhouse pilots and DER potential study findings suggests that a programmatic approach is best suited for leveraging behind-the-meter DERs to support AAR needs. This could pave the way and build capability for eventual market participation, where suitable; at the same time, province-wide program delivery infrastructure could be leveraged for DER incentives.

**Program Design Considerations and Benefits**

The opportunity for targeted CDM to help meet provincial and regional needs greatly exceeds what can be pursued through the original LIP, with its 57 MW target and associated budget. A screening exercise identified 23 regional opportunities in addition to the four that were pursued in the first half of the framework, totaling approximately 740 MW, of which approximately 435 MW is aligned with provincial system peak.

The IESO is currently targeting four areas through the first cycle of the LIP: York Region; Ottawa; the Richview-to-Manby area in Toronto; and the Belle River area in Windsor-Essex.

LIP initiatives and enhancements are required to be cost-effective at the province-wide level, thereby providing both provincial and local ratepayers value through targeted approaches. Currently, program cost-effectiveness testing does not account for transmission avoided costs, which suggests even higher ratepayer value where transmission investment deferral is achieved, as in these proposed programs. Increased investment in the LIP is, therefore, viewed as an important opportunity to stack the provincial system and local system benefits to comprehensively support grid management.

### Targeted Greenhouse Program

The IESO proposed a targeted regional program in Southwestern Ontario offering incentives for greenhouse growers to install LED lighting and controls for greenhouse lighting and environmental systems, with an option to include incentives for BTM DERs, such as combination solar generation and energy storage. Incentives will be delivered using existing retrofit service providers for expedient administration, leveraging cost efficiencies and established relationships.

Growers have expressed interest in an enhanced measure offering for lighting and greenhouse controls, and have signaled that they are also considering BTM solar photovoltaics (PV) plus storage:

- The solution would store solar energy during the afternoons, when greenhouse electricity load is much lower, and use stored energy during extended growing hours in the early mornings, to reduce local peak demand.
- Solar PV would be roof-mounted on warehouses and office buildings, to avoid using valuable agricultural land.

#### Program Design Considerations and Benefits

Current horticultural lighting forecast will exceed the Retrofit Program budget by 136 per cent while missing the peak demand target in the 2021–2024 CDM Framework Program Plan by 10 per cent; the program would have to stop accepting all applications in mid-2023 to stay within budget. Greenhouse-targeted funding would free up Retrofit Program incentives to achieve the existing program target plus an additional 70 MW of provincial peak demand reduction by targeting a measure mix that excludes horticultural lighting, resulting in an additional $96 million in system benefits to ratepayers.

Although proposed greenhouse measures only provide an estimated 4 MW of provincial peak demand reduction, the program would reduce the Southwestern Ontario local peak demand by approximately 225 MW, enabling more customers to connect sooner and further fostering economic development.

Pursuing proposed greenhouse savings in the Kingsville/Leamington areas in the current Framework is an important complement to the existing planned transmission reinforcements to the area:

- Due to the magnitude of lit greenhouse acreage that is forecast to connect between now and 2035 (over 2,000 MW), driving as high an uptake of LEDs as possible within this customer segment will continue to offer locational benefits.
- High adoption of LEDs will ensure the most efficient use of planned facilities and potentially defer further bulk reinforcements that would be needed beyond 2035 to meet future demand in the greenhouse sector and in the area more broadly.
- Targeted greenhouse savings could result in:

- Connecting additional acreage that would not be connected if older lighting technology were used.
- Potentially delaying the required in-service date for two additional stations and associated tap line in the Kingsville area.
- Increased efficiency per acre, which could result in the queue of greenhouse loads materializing more slowly than currently forecast.

# Appendix 5: Program-Specific Findings and Opportunities: Indigenous and Mass Market Programming

## Indigenous Conservation Programming: A New Approach - Report on Energy Conservation for First Nations and Métis in Ontario

A summary of themes from the IESO's 2018 Indigenous Conservation Programming: A New Approach, Report on Energy Conservation for First Nations and Métis in Ontario, and how programming has evolved in response is provided in Table A5.1. This report was informed through online surveys and in-person engagements.

**Table A5.1 | Summary of Feedback from Indigenous Conservation Programming: A New Approach, Report on Energy Conservation for First Nations and Métis in Ontario**

| Theme | Current State |
|---|---|
| On-reserve program availability, as there is no consistency in program delivery across First Nations communities. | The Energy Affordability Program (EAP) is available to First Nation and Métis communities; Remote First Nations Energy-Efficiency Program (RFNEEP) and First Nations Community Building Retrofit Program(FNCBRP) are available to First Nations communities. |
| Increase program awareness, as some participants indicated they were unaware of the residential program offering. | Targeted EAP outreach strategies being developed to reach Indigenous participants. |
| Suggest that Indigenous programs be branded as community, not Save on Energy, programs. | A dedicated area of the Save on Energy website has been developed for First Nations participants; this area also links to EAP brochures available in Ojibwe, Cree and Oji-Cree. As well, the IESO and Save on Energy brands are increasingly being positioned together to build on existing awareness. |

| Theme | Current State |
| --- | --- |
| Program funding would benefit from<br>• Dedicated funding amount for each First Nations community, rather than having a global budget.<br>• A non-burdensome program application process. | Within the FNCBRP, each community is eligible for up to $100,000 of energy-efficiency upgrades across band-owned and -operated facilities. There are dedicated Save on Energy representatives to support communities with accessing the incentives through this program and identifying opportunities to participate in other programs, as applicable. |
| Capability-building support would be helpful as First Nations band staff resources are stretched, and priorities are often shuffled. Consider:<br>• Offering support for regional energy managers assisting multiple communities in addition to the one energy manager per community model.<br>• Supporting data transparency, as there is typically a lack of energy data in on-reserve communities. | There are 39 IESO-funded Community Energy Champions (CECs) employed in 35 First Nations communities and organizations to support energy management and enable participation in the Save on Energy programs. In addition, the FNCBRP offers energy audits and facility benchmarking at no cost to communities to help identify opportunities for energy-efficiency measures. |
| Educational materials/vendors and installers don't show homeowners how to use equipment; energy-efficiency–related educational materials from a trusted source would be beneficial. | Energy-education modules are an important aspect of the support program offerings. Modules have been developed for the EAP and RFNEEP; these will continue to be assessed on their effectiveness, and opportunities for continuous improvement will be pursued. |
| Lack of knowledge transfer from First Nations and Métis councils; consider providing:<br>• A mechanism to enable First Nations band staff and Métis council members an opportunity to network.<br>• Funding for mentorships/internships shared across communities. | The IESO undertakes the following to enable knowledge transfer:<br>• IESO's Annual First Nations Symposium<br>• EAP delivery partner engaged with 23 of 29 Friendship Centres in 2021<br>• The EAP Roundtable<br>• Leveraging IESO Connects and CECs |

| Theme | Current State |
|---|---|
| The state of disrepair of existing housing stock makes energy conservation challenging. | There are dedicated health and safety (H&S) funds to enable retrofits where manageable H&S issues can be addressed for both the EAP and RFNEEP. The amount of funding available for H&S was increased for remote communities, reflecting the greater need for remediation. |
| Would like to see distributed energy and net metering funding for renewable energy equipment and/or micro grids. | This is currently available through the IESO's Energy Support Program's Indigenous Energy Projects stream. |

## Mass Market Programs and Awareness

### The 2022 Save on Energy Brand Equity Survey

Survey findings indicate that trust in the Save on Energy brand has remained strong, at 80 per cent, despite a decrease in overall awareness to 43 per cent after a high of 72 per cent in 2017. Consumers report that their motivations for pursing energy-efficiency upgrades are to (1) save money on bills, mainly electricity, followed closely by natural gas bills; (2) help the environment/reduce greenhouse gas (GHG) emissions; and (3) make their homes more comfortable.

The top-ranked barriers to implementing energy-efficiency projects are: (1) the cost of the measure/upgrade being too high; (2) no immediate need (i.e., current equipment is in good working order); and (3) consumers feeling that their home is already energy efficient.

### Consumer Electricity Preferences and Behaviours Survey

Cost is the most important priority for residential consumers, followed by grid reliability/resilience and the control of energy usage. Residential consumers indicated that they favour time-of-use rates and could be motivated to support more dynamic pricing if there was a guarantee of saving on their energy bills. In addition, the option to choose their pricing model is an attractive proposition. Residential consumers expressed strong interest in real-time alerts about peak consumption and report being more knowledgeable about smart thermostats than other distributed energy resource (DER) technologies and are seeking educational materials on DERs.

#### Findings

- Residential consumers are willing to and actively seeking opportunities to increase energy efficiency and control over energy costs, but lack the knowledge and direction on how to proceed.
- There are currently no mass-market IESO CDM programs in-market.

- The residential sector is currently served by Natural Resources Canada and Enbridge, which focus on GHG emissions and natural gas reductions, respectively.
    - Collaborations represents an important consideration for integrated whole-home solutions that may serve households to the greatest extent possible.

**IESO Opportunities**

- Explore the inclusion of cost-effective mass-market residential programs that meet both residential consumer and system needs in future, where offerings are cost-effective and fill a gap in the market.
- Leverage the enduring trust of the Save on Energy brand for education and awareness of energy-efficiency best practices in the home and to drive participation in the Save on Energy programs.
- Residential demand response is being pursued as an Annual Acquisition Report report-back program, which can be quickly deployed to address mid-decade summer capacity needs.

# Appendix 6: Program-Specific Findings and Opportunities – Small Business, Commercial, Institutional and Industrial Sectors

The following sections are a review of each program, with insights and proposed actions resulting from market research, internal and external stakeholder feedback, and analysis.

## Small Business Program

### Customer Satisfaction

Nearly all (94 per cent) of Small Business Program participants report that the program either met or exceeded their expectations. Delivery vendors excelled in the area of customer service despite experiencing disruptions due to coronavirus disease 2019 (COVID-19) lockdowns throughout 2021. Overall participant satisfaction was lower than expected, coming in at around 70 per cent, driven by low levels of satisfaction with the range of eligible measures offered by the program.

### Save on Energy Brand Equity Survey

Small businesses indicated that they are interested in many high-cost non-lighting energy-efficiency upgrades, including lighting controls; smart thermostats; refrigeration upgrades; unitary air conditioning; distributed energy resources (DERs), mainly solar panels; and, to a lesser extent, battery storage.

Their main motivations for pursing energy-efficiency upgrades are to save money on bills, mainly electricity, followed closely by natural gas bills; help the environment/reduce greenhouse gas (GHG) emissions; increase the level of control they have over their energy use; and upgrade to the latest technologies.

The top-ranked barriers to implementing energy-efficiency projects are (1) the high cost of the measure/upgrade, (2) having no immediate need (i.e., current equipment is in good working order) and (3) that their business is already energy efficient. Small businesses also noted that a rebate was not available for the measure(s)/upgrades they were interested in implementing.

The Save on Energy brand has achieved a very high level of trust (96 per cent) among small businesses in Ontario. Continuing to have the Save on Energy brand as a trusted source of information to guide and assist small businesses in their path toward implementing deeper energy-savings measures, mainly non-lighting measures and controls, is important.

### Consumer Electricity Preferences and Behaviours Survey

Cost was identified as the most important priority for small businesses, followed by grid reliability/resilience and power quality. Small businesses expressed a high likelihood of hosting solar panels on their property in the future. Small businesses have similar barriers to installing DER technologies as residential consumers: upfront cost and other investment priorities. Many also indicated that they do not know enough about DERs, or that they need proof of their return on investment.

#### Findings

- The Small Business Program has achieved a high level of customer satisfaction; however, the 2021 survey findings indicated that small businesses are looking for more diverse measure offerings and newer technology.
    - The Small Business Program has been enhanced for the 2021-2024 Conservation and Demand Management (CDM) Framework with the addition of select non-lighting measures such as lighting occupancy sensors, electronically commutated motor upgrades for refrigeration equipment and smart thermostats. The new measures were introduced in response to market feedback, their success in similar programs and their cost-effectiveness. The enhanced program launched in March 2022.
- The COVID-19 pandemic affected program delivery significantly due to the inability to enter business premises for several months. Service providers and customers were interested in the program and, therefore, it is anticipated that it will regain momentum and begin to achieve strong results in the near future.

#### IESO Opportunities

- Continue to explore the introduction of additional new measures and outreach to new sectors, to expand the reach of the program.
- Explore a customer co-pay model when the full measure cost cannot be covered by the program cost-effectively and where small business customers find sufficient value in a shared investment. For example, small business customers must currently access the Retrofit Program for demand-control kitchen ventilation, despite the measure almost exclusively serving small businesses (e.g., restaurants) through the Retrofit Program. New measure types such as these may be cost-effectively included in the Small Business Program for an improved customer experience if the full-payment, direct-install delivery model were to change.
- Increase available heating, ventilation and air conditioning (HVAC) measures (e.g., rooftop-unit controls and upgrades).
- Develop measures for the small manufacturing sector (e.g., compressed-air system upgrades).
- Explore collaboration with Enbridge to expand program reach and participation, and potentially provide administrative cost savings.
- Explore how the program might enable the direct-install Demand Control Kitchen Ventilation measure co-delivered with Enbridge through the Retrofit Program and expand direct-install offerings in the food-services sector.

# Retrofit Program

## Customer Satisfaction Survey

Overall, the Retrofit Program is meeting or exceeding customer expectations (92 per cent). The program is excelling in the areas of customer service and vendor performance despite experiencing delivery disruptions due to COVID-19 lockdowns throughout 2021. Customers identified (1) the range of eligible measures offered by the program via the prescriptive track and (2) the level of available incentives offered by the program for some eligible measures, as opportunities to improve satisfaction.

### Findings

- Horticultural lighting has taken a much larger share of the budget than anticipated; in addition, a large volume of projects was carried over from the Interim Framework, including a high proportion of exterior lighting. This has led to the program being behind on its peak demand reduction target while being overspent on budget relative to the CDM Program Plan.
- High and stable customer satisfaction scores were noted; the majority of Retrofit Program participants are satisfied with the program experience overall.
- Areas for improvement include the range of eligible products/projects and the level of incentives relative to measure costs.
- Retrofit Program incentive contribution levels are decreasing as project costs increase due to inflation.
- Light-emitting diode (LED) lighting and high-efficiency HVAC measures are increasing in adoption and will become the baseline over time; decreasing energy-savings opportunities reflected in evolving equipment baselines are increasing the savings acquisition cost.
- Lighting and HVAC controls are important new measures to add to and expand on in the program.

### IESO Opportunities

- Continue to evaluate prescriptive measure enhancements for inclusion in the bi-annual program-update cycle, including opportunities for incentive realignment and measure addition/subtraction.
- Move forward with moving most lighting measures to a midstream delivery model in 2023, where incentives will be paid directly to lighting distributors to reduce administrative costs and improve customer experience. Distributors may use the incentives for point-of-sale discounts, increased marketing and improved stocking of energy-efficiency alternatives.
- Pursue a custom lighting stream focused on improved lighting design and increasing the penetration and sophistication of lighting controls.
- Implement the custom track standard offer for non-lighting measures, as proposed in the Annual Acquisition report back; this will expand the range of projects accepted into the program.
- Continue to monitor program-level cost-effectiveness and adjust measure mix and incentives to adapt as market conditions change.

## Energy Performance Program

### Findings

- The program is exceeding early participant uptake expectations based on COVID-19 baseline modelling and measurement and verification challenges.
- A demand-savings incentive was introduced, but many participants have not been motivated to pursue it because of the additional modelling required.

### IESO Opportunities

- Implement planned program enhancements, including procuring a dedicated program delivery vendor, adding a centralized measurement and verification platform and providing an aggregator participant stream. These enhancements are expected to streamline administration and continue to improve performance in the second half of the Framework. The platform will also enable a greater focus on and measurement for peak demand savings.

## Energy Manager Program

### Findings

- With the transition from an energy savings target to a peak demand savings target under the current Framework, some participants have founding it challenging to interpret the more complex process for quantifying demand savings (i.e. only considering savings occurring during certain hours of specific months).
- Shifting organizational priorities to target GHG savings has challenged participants to align with energy savings targets.
- Feedback indicates that incentive levels are considered reasonable by the target market.
- Some participants who had been in the program for more than five years expressed concern when it was announced that the program in its current form would be ending at the end of 2022 and therefore funding for an energy manager would stop; evidence suggests that most participants will retain their energy managers even without funding.

### IESO Opportunities

- Prepare a retrospective evaluation of the Energy Manager Program, which was in-market for many years, to understand the multi-year impacts from a holistic perspective to inform future design.
- Proceed with the transition to the Strategic Energy Management (SEM) Program as planned in 2023; this will drive deeper structural embedding of energy management into participating organizations.
- The marketplace continues to express interest in training on energy management and capacity building, this is encouraging and bodes well with respect to anticipated participation in the SEM program.

## Industrial Energy-Efficiency Program

**Findings**

- Applications for the first round of funding were less than the available budget; eligibility questions suggest an ongoing need for customer engagement to explain the new program objectives and requirements and to expand the pool of potential participants and projects for consideration.
- Early feedback suggests that customer interest may be affected by the current focus on decarbonization and reducing fossil fuels; while this may present a challenge for uptake, it also presents an opportunity to promote electricity efficiency as a key part of an integrated energy-management, electrification and emission-reduction strategy.

**IESO Opportunities**

- Carry over any unused budget to the second program cycle in 2023.
- Consider enhancements for the second program cycle in 2023, depending on the final outcomes of the 2022 cycle. These may include changes to project eligibility, savings thresholds, incentive caps and/or considering more flexibility around behind-the-meter generation and other DERs.
- Continue customer outreach and awareness building to develop a deeper pool of potential participants and projects for consideration in the next funding round.

## Local Initiatives Program (LIP)

**Findings**

- The launch of LIP offerings has been challenged by a number of factors:
  - Avoiding duplication of the existing comprehensive suite of business programs has limited opportunities for the market to bring forward new program concepts.
  - Relatively small budgets and targets for local programs have limited market interest in investing the time and effort required to respond to these procurements.
  - The comparatively limited opportunities in the residential sector and higher cost/effort of delivering programs to mass markets has challenged the ability of the market to propose cost-effective offerings.

**IESO Opportunities**

- Allow limited-time regional incentive adders in province-wide programs so that LIP offerings can leverage province-wide program-delivery infrastructure to quickly implement regional programming.
- Leverage existing program infrastructure and signal flexibility for including incentives for BTM DER solutions to explore the possibility of increasing LIP effectiveness while also supporting emerging customer preferences.

# Appendix 7: Jurisdictional Benchmarking Exercise

The program review task included a conservation and demand management (CDM) portfolio benchmarking exercise against certain U.S. jurisdictions based on reported energy-efficiency savings that were compared with annual electricity sales (i.e., electricity consumption) at the state/provincial level. The benchmarking exercise also sought to understand the source of reported energy-efficiency savings by sector (i.e., residential versus non-residential) and program offerings.

The objectives of the jurisdictional benchmarking exercise were to:

- Identify jurisdictions within North America to compare Ontario's historical energy-efficiency achievements against
- Identify a time period and metric of comparison for the benchmarking analysis
- Benchmark Ontario against selected jurisdictions
- Understand which programs and sectors drive energy-efficiency savings in these jurisdictions
- Understand if there are any program gaps or missed opportunities that could help inform future program design/direction in Ontario

Five jurisdictions of interest were selected for the portfolio benchmarking exercise, based on their proximity to Ontario (i.e., similar climate zone) and similar state-wide energy consumption patterns (in megawatt-hours [MWh]) (i.e., similar-sized electricity market)

1. Illinois (this state was the closest direct comparison to Ontario)
2. Michigan
3. Ohio
4. Pennsylvania
5. New York

Two additional jurisdictions were also included in the analysis, as they represent the best-in-class performance in terms of energy-efficiency savings within North America:

6. Massachusetts
7. Rhode Island

## Savings and Utility Sales Comparison of Ontario Against Selected Jurisdictions

The metric used to benchmark Ontario against other jurisdictions was the percentage of reported gross verified energy savings (in MWh) divided by the annual energy consumption (in MWh) within a given year. The reported energy-efficiency savings are therefore relative to the energy consumed within a given jurisdiction. Energy-efficiency saving results were also separated by sector (residential or non-residential) to provide additional insights on the sources of savings.

Figure A7.1 outlines the proportion of energy-efficiency energy savings in Ontario between 2015 and 2020. Savings were also broken down by residential, commercial and industrial sectors. Figures A7.2 and A7.3 illustrate peak program maturity in 2017, the retirement of residential programs beginning in 2018, the Framework transition effect in 2018–2019 and the impact of the COVID-19 pandemic in 2020.

The peak in energy-efficiency savings in 2017 was the result of both the energy-efficiency program continuity of the Retrofit and the Residential Heating and Cooling programs as well as the notable success of the Coupons and Instant Discount programs due to the implementation of light-emitting diode (LED) lighting in the residential market. This trend reinforces the relative long energy-efficiency program life cycles and the benefit of year-over-year continuity in program offerings.

**Figure A7.1| Ontario Commercial/Industrial and Residential Energy-Efficiency Saving versus Energy Sales**

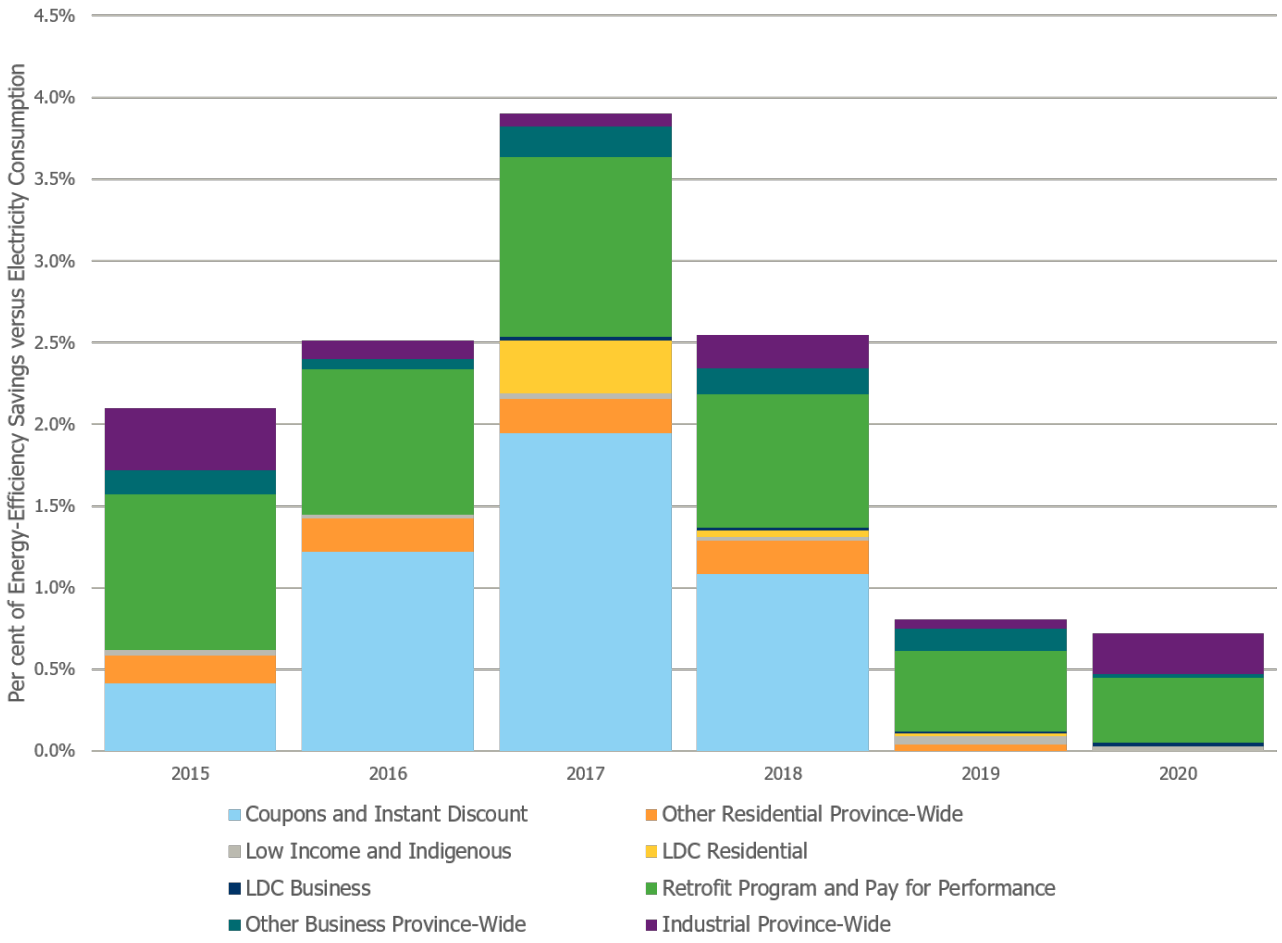


**Figure A7.2 | Commercial and Industrial Energy-Efficiency Savings versus Utility-Level Commercial and Industrial Consumption**

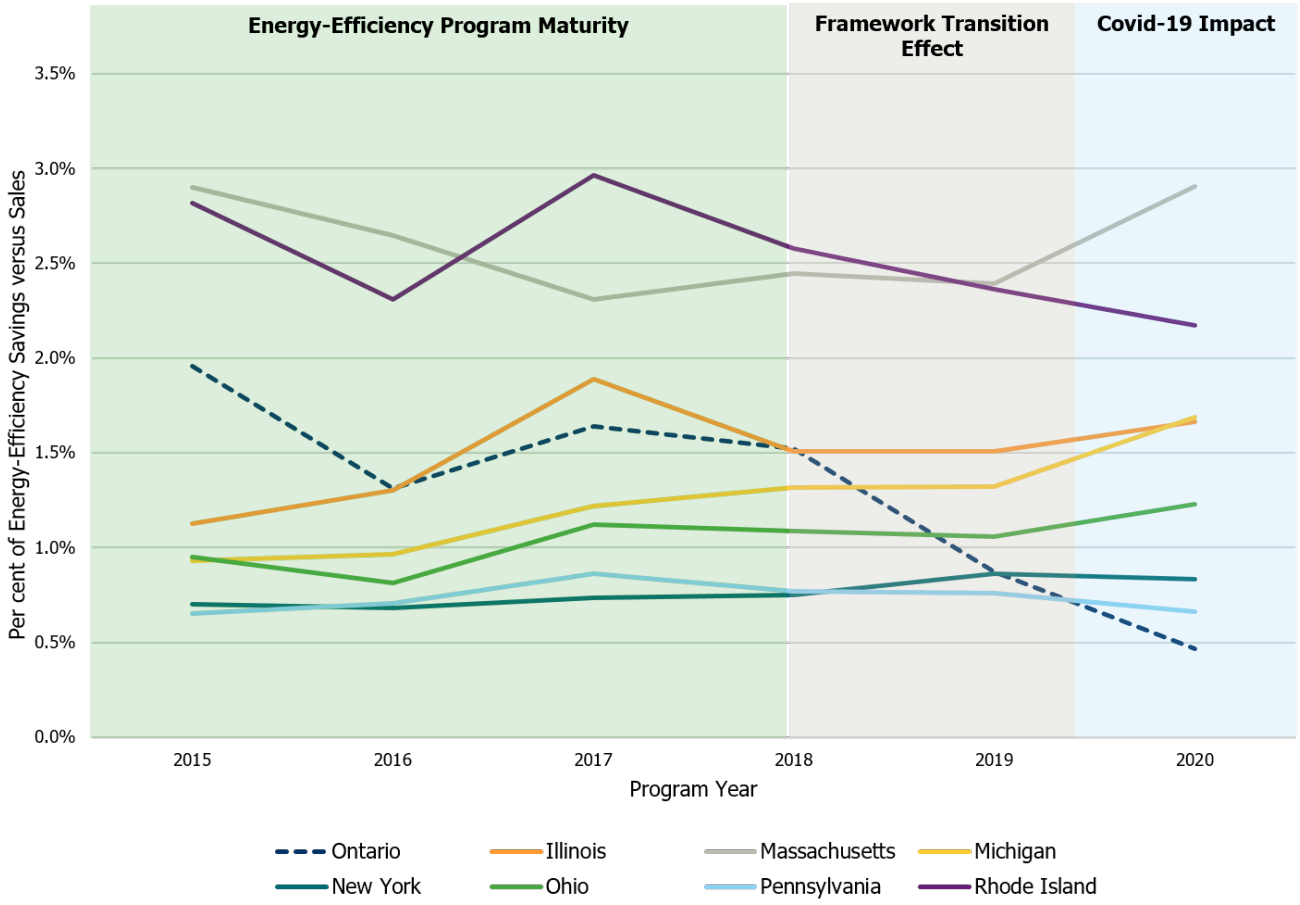
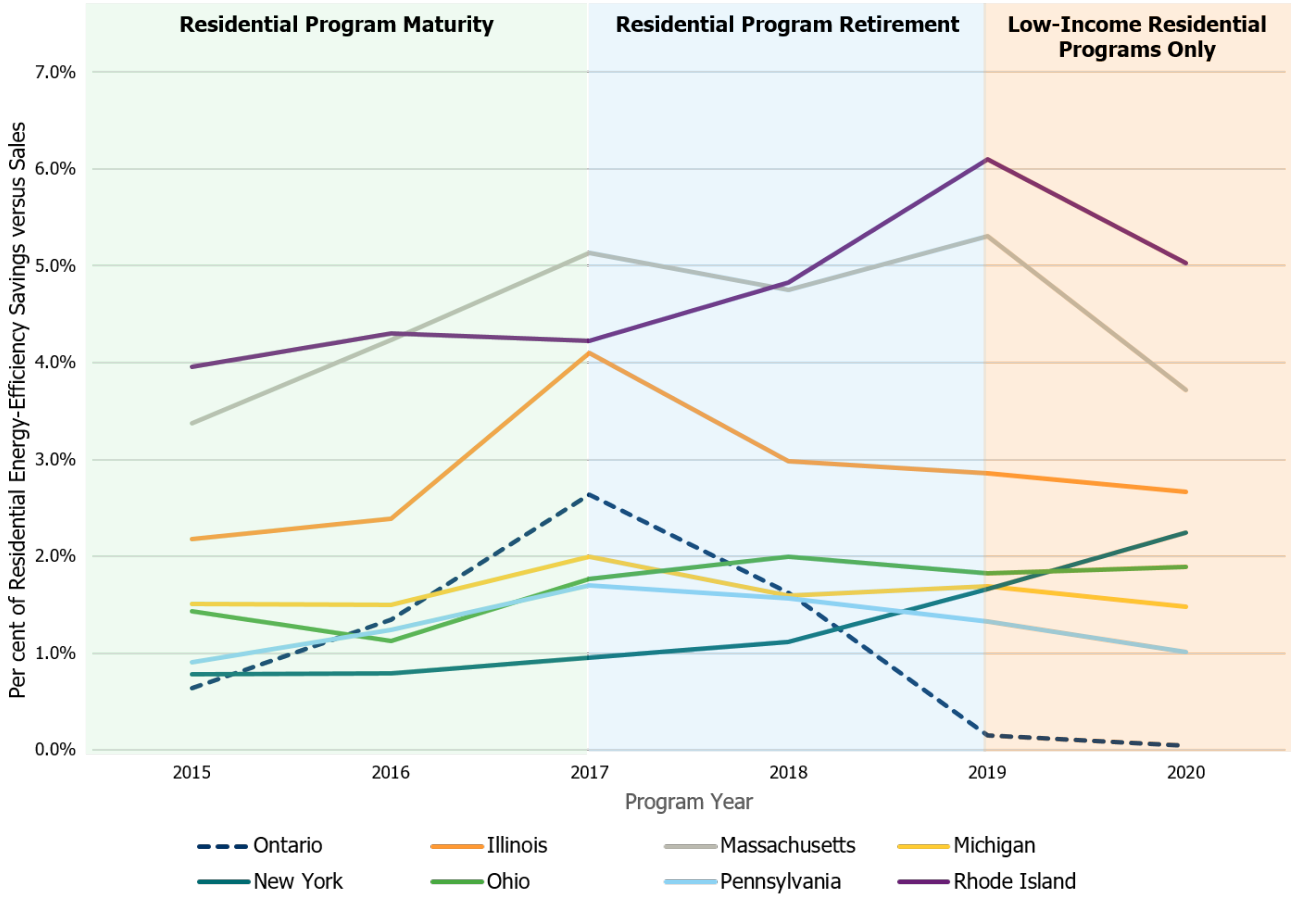


**Figure A7.3 | Residential Energy-Efficiency Savings versus Utility-Level Residential Energy consumption**




The relative success of energy-efficiency savings in other jurisdictions can be attributed to continuity in program offerings and the fact that these jurisdictions continue to claim significant savings from measures that the Independent Electricity System Operator (IESO) have determined to be non-viable[14] or have retired due to changes in codes and standards, market saturation or poor performance of pilot projects – particularly the higher residential savings resulting mainly from the delivery of residential behavioural programs such as home-energy reports and online marketplaces for household energy-efficiency items. As well, other jurisdictions have dedicated a greater proportion of their budgets toward marketing, with median marketing spending at 2.7 per cent of budget over 2020–2021 compared with the IESO's 0.5 per cent marketing budget.

Overall, Ontario is performing well in the commercial and industrial sector, with notable growth potential in the residential sector. However, this analysis reinforces the need for market research, pilot programs and collaboration with Enbridge and Natural Resources Canada to determine where energy-efficiency savings would be most cost-effectively achieved going forward.

[14] A measure could be deemed non-viable due to one or more of the following reasons: changes in baseline technologies eliminating savings, low or uncertain effective useful life/persistence, high free ridership and/or because it was determined to not be cost-effective upon evaluation.

## Program Trends in Other Jurisdictions

Reviewing program best practices in other jurisdictions is an important component of continuous program improvement in Ontario. As a number of states and provinces are at different stages in their evolution of energy-efficiency programming, much can be learned from sharing and working together. This section highlights the important trends the IESO uncovered during the jurisdictional research phase of the programs review task. Many of these trends reflect commonalities in how customer needs are changing across North America – e.g., increased spending on low-income programs to respond to an increased focus on equity, diversity, and inclusion; and integrating CDM and distributed energy resource (DER) incentives to address customer needs for support with decarbonization.

### Decarbonization

As an increasing number of states adopt ambitious clean energy goals, many are deploying energy efficiency integrated with DERs to provide flexibility to both customers and the grid, as well as complementing and facilitating the growing integration of renewable energy. Utilities are also offering more fuel-switching programs, particularly for devices powered by increasingly clean electricity, to satisfy their regulated greenhouse (GHG) reduction targets.

Some states have also begun considering savings on a combined fuel-neutral basis (e.g., New York and Massachusetts), GHG reductions (e.g., the Sacramento Municipal Utility District, Massachusetts and the District of Columbia) or total system benefit (e.g., California). This approach to benefits accounting is still in its infancy, but as more states prioritize beneficial electrification as a decarbonization strategy, the IESO expects to see this practice to become more common.

#### Status in Ontario

Feedback received across all Ontario sectors indicated that GHG reductions are a high priority. In a survey conducted by the IESO in 2022 on clean-energy credits, 47 per cent of respondents noted that they are exploring the installation of DERs on-site to mitigate GHG emissions, while 35 per cent are exploring clean-power purchase agreements[15]. Participants are also seeking to increase fleet electrification and install electricity storage capacity, conducted by the IESO in 2022 on clean energy credits, 47 per cent of respondents noted that they are exploring the installation of DERs on-site to mitigate GHG emissions, while 35 per cent are exploring clean-power purchase agreements. Participants are also seeking to increase fleet electrification and install electricity storage capacity.

Energy efficiency and DERs are complementary strategies, and utilities in other jurisdictions are leveraging energy-efficiency programs for the delivery of DERs to provide complete demand-side solutions to their customers. Save on Energy is uniquely positioned to support the demand-side energy transition in Ontario. Save on Energy can support consumers by educating them about the role that energy efficiency can play in decarbonizing homes and small businesses. The IESO is also participating in the American Council for an Energy-Efficient Economy's Building Electrification Working Group to understand strategies used by and emerging best practices from other program administrators.

[15] Please see the IESO's Clean Energy Credits engagement page for more information about the survey and its results.

### Strategic Energy Management (SEM)

SEM is a commitment to an internal structure within the customer's organization that helps identify and pursue energy-efficiency improvement, emulating continuous improvement models widely adopted by businesses to increase safety and product quality. SEM programs are offered in a growing number of jurisdictions in North America, and are demonstrating success in serving commercial and industrial customers across the continent.

#### Status in Ontario

The IESO has successfully piloted cohort-based SEM programs through the Grid Innovation Fund. In 2023, the IESO will evolve its Energy Manager Program to SEM. The IESO is participating in the Consortium for Energy Efficiency SEM Committee and the North American SEM Collaborative, two unique industry groups comprising utility peers, commercial interests and research organizations. These groups ensure support for the development of SEM for Ontario CDM in alignment with best practices and continuous improvement.

### Multi-Family Building Programs

These programs are proliferating and diversifying. Most of them have successful cost-effective models providing both gas and electric measures, and common area and in-suite measures, with services including audits, direct-install measures, whole-building retrofits and engineering and construction funding.

#### Status in Ontario

The IESO does not have a mass-market program available for this sector, although common area measures can be incentivized through the Retrofit Program. It is recommended that the IESO explore the development of a turnkey solution for multi-family and multi-family social housing facilities.

### Low-Income Programs

Reaching customers with high energy burdens is growing in importance – seven of the eight profiled programs in other jurisdictions have increased their spending over the past three years. Income-eligible housing remains a significant opportunity for energy efficiency, and short-term global economic circumstances indicate the need for increased support and investment to make a noticeable difference for these customers.

#### Status in Ontario

The IESO has included a list of recommendations to support a greater number of high-need customers in Appendix 5.

### Lighting Programs

Lighting programs are deploying new designs and strategies, shifting toward advanced lighting and control technologies while focusing less on 1:1 LED bulb- or fixture-replacement projects.

Some jurisdictions are moving away from rebates for lighting and instead funding upstream and midstream programs, which provide incentives for customers when they pay for their order through a network of manufacturers, suppliers and retailers.

### Status in Ontario

The Custom Lighting Program will support this market evolution in 2023. The program will expand upon the current measure offering for lighting controls and will seek to provide support for improved lighting design and redesign.

Most of the current lighting incentives offered through the Retrofit Program will be moved to the midstream distributor channel in 2023, to reduce participation barriers.

## New-Construction Programs

These programs continue to be offered in other jurisdictions. They focus on pathways to net-zero energy and decarbonization. A number of programs support the construction of ultra–low-energy buildings in both the commercial and residential sectors.

### Status in Ontario

Based on stakeholder feedback, the IESO has identified an opportunity to explore the potential reintroduction of new-construction programming in Ontario.

## Upstream- and Midstream-Focused Programs

These products leverage rebates in product-distribution channels for greater market impact and improved cost-effectiveness.

### Status in Ontario

The IESO is developing a midstream program for lighting and will continue to assess the opportunity for other retrofit measures. Analysis suggests that a midstream delivery of standard equipment replacements would achieve more uptake at a lower cost in a number of key categories currently driving the Retrofit Program.

Customer and contractor feedback is generally positive on the approach; the IESO will continue to strengthen relationships with distributors to provide maximum ratepayer value. To this end, the IESO has engaged lighting-distribution channels to introduce and inform midstream lighting offerings and is developing a project plan for developing stronger relationships in key non-lighting sales channels for future consideration.

# Appendix 8: Energy Efficiency Auction Pilot – Detailed Results to Date

The Energy Efficiency Auction Pilot (EEAP) was held in March 2021 and successfully awarded nearly the full $5 million budget to deliver 7.4 megawatts (MW) of peak demand reduction of winter and 6.6 MW of summer peak demand reduction. In total, nine successful energy-efficiency capacity providers cleared 17 energy-efficiency resources, which included a range of different technologies, participants and facilities in the commercial, institutional and industrial sectors. The weighted average of the cleared EEAP offer prices is $334/kW for the winter commitment period and $378/kW for the summer, which is below the historical custom Retrofit Program incentive rates of $400–$800/kW (kilowatts). More information about the EEAP clearing results, and the specific participants and resources that cleared the auction, is outlined in Table A8.1 and Table A8.2, respectively.

**Table A8.1 | Summary of EEAP Clearing Results**

| Metric | Winter Obligation Period | Summer Obligation Period |
|---|---|---|
| Number of resources cleared | 16 | 17 |
| Seasonal energy efficiency capacity cleared (MW) | 7.4 | 6.6 |
| Weighted average accepted annualized offer price ($/kW$_{season\text{-}year}$) | $34.20 | $38.72 |
| Lowest accepted annualized offer price ($/kW $_{season\text{-}year}$) | $15.00 | $16.00 |
| Highest accepted annualized offer price ($/kW $_{season\text{-}year}$) | $102.04 | $102.04 |

**Table A8.2 | Summary of EEAP Obligations**

| Energy-Efficiency Capacity Provider | Winter Energy-Efficiency Capacity (kW) | Summer Energy-Efficiency Capacity (kW) | Energy-Efficiency Resource(s) Description |
|---|---|---|---|
| Aenon Technologies Inc. | 400 | 360 | Occupancy sensors, smart thermostat, light-emitting diode (LED) fixtures and rooftop unit controllers installed at refrigerated warehouses |

| Energy-Efficiency Capacity Provider | Winter Energy-Efficiency Capacity (kW) | Summer Energy-Efficiency Capacity (kW) | Energy-Efficiency Resource(s) Description |
|---|---|---|---|
| Efficiency Capital (EC) Inc. | 597 | 469 | LED fixtures, occupancy sensors, refrigeration and variable-frequency drives installed at various commercial and institutional facilities |
| Gerdau Ameristeel Corp. | 545 | 545 | Compressed-air pipeline replaced at an industrial facility |
| Mohawk College of Applied Arts and Technology | 1,000 | 238 | Central campus thermal energy storage system to enable load shedding of chiller plant and electric boiler installed at a university campus |
| Ontario Clean Water Agency | 162 | 161 | High-efficiency motors, ultra-violet system, variable-frequency drives, turbo blowers, heat pump, HVAC (heating, ventilation and air condition) system and exterior lighting replacement installed at waste water treatment plants |
| Rodan Energy Solutions Inc. | 1,400 | 1,400 | Occupancy sensors, variable-frequency drives and totally enclosed fan-cooled motors installed at various facilities |
| The Corporation of the City of London | 128 | 128 | High bay and linear ambient lighting at municipal buildings |
| Unity Health Toronto | 162 | 261 | Lighting retrofit, chiller compressor, variable-speed drives, recommissioning, variable frequency drivers and control optimizations, static pressure sensor, condenser pumps and chilled water pumps installed at a hospital |
| Voltus Energy Canada Ltd. | 3,050 | 3,050 | Lighting and controls retrofits completed at various facilities |

Since the EEAP was cleared, participants have experienced considerable challenges delivering these resources and have relinquished commitments for the majority of cleared resources leading up to the November 1, 2022, to February 28, 2023, period to deliver winter-peak demand reductions.[16] Participants have cited a number of challenges that led to these relinquishments, including difficulty securing internal project funding to deliver projects, turnover in staffing during the EEAP forward period, technology price escalation and workforce impacts of the COVID-19 pandemic.

Participants that had planned to deliver aggregated resources by enrolling customers and installing measures across multiple facility locations also cited challenges competing with other Save on Energy programs, such as Retrofit. For the most part, aggregated EEAP resources that cleared the auction comprised similar measures to those that are captured under the existing Save on Energy suite of programs, which covers a broad set of cost-effective CDM measures that are marketed under an established brand with strong reported customer awareness and level of trust. Developing entirely new programs that can enroll customers and implement these aggregated EEAP resources with the forward period appears to have presented challenges to EEAP participants, particularly given this overlap and competition with existing Independent Electricity System Operator (IESO) programs.

Moving forward, the IESO is continuing to monitor EEAP resource delivery and is supporting participants as they develop deliverables to confirm the final composition of their energy efficiency resources, establish rigorous measurement and verification plans and report savings. As the pilot is still in progress, the IESO is cautious about drawing broad conclusions at the present time. Following the completion of the June 1 to August 31, 2023, period to deliver summer peak demand reductions, the IESO will conduct an evaluation of the pilot. The evaluation will, among other objectives, produce the net verified savings results necessary to effectively compare the cost to acquire CDM through the EEAP relative to other program and procurement mechanisms. Findings from the evaluation are expected to inform future competitive CDM procurements.

[16] Given the limited pool of participants and business sensitivity of project status, the specific participants who have relinquished commitments are not identified.

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